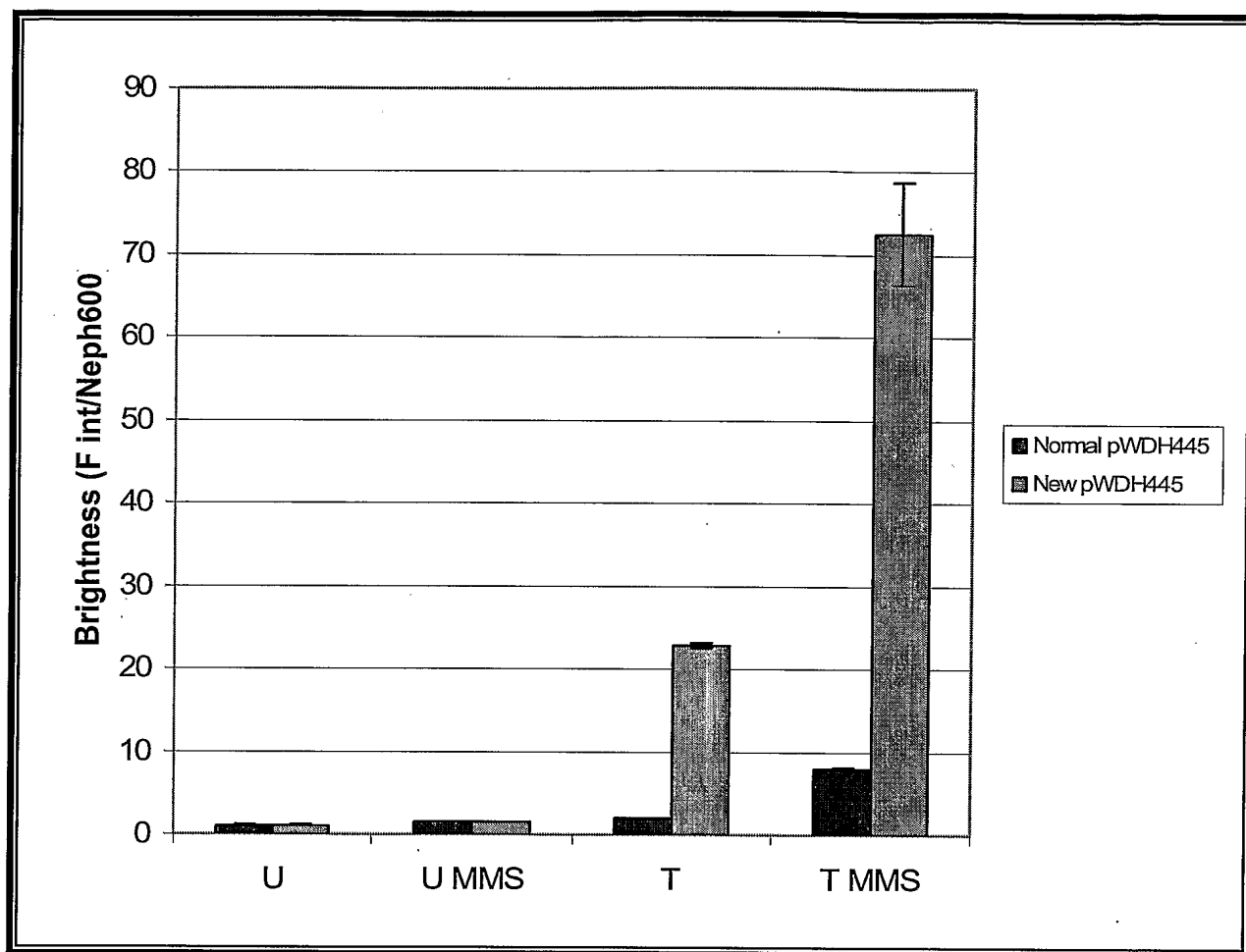
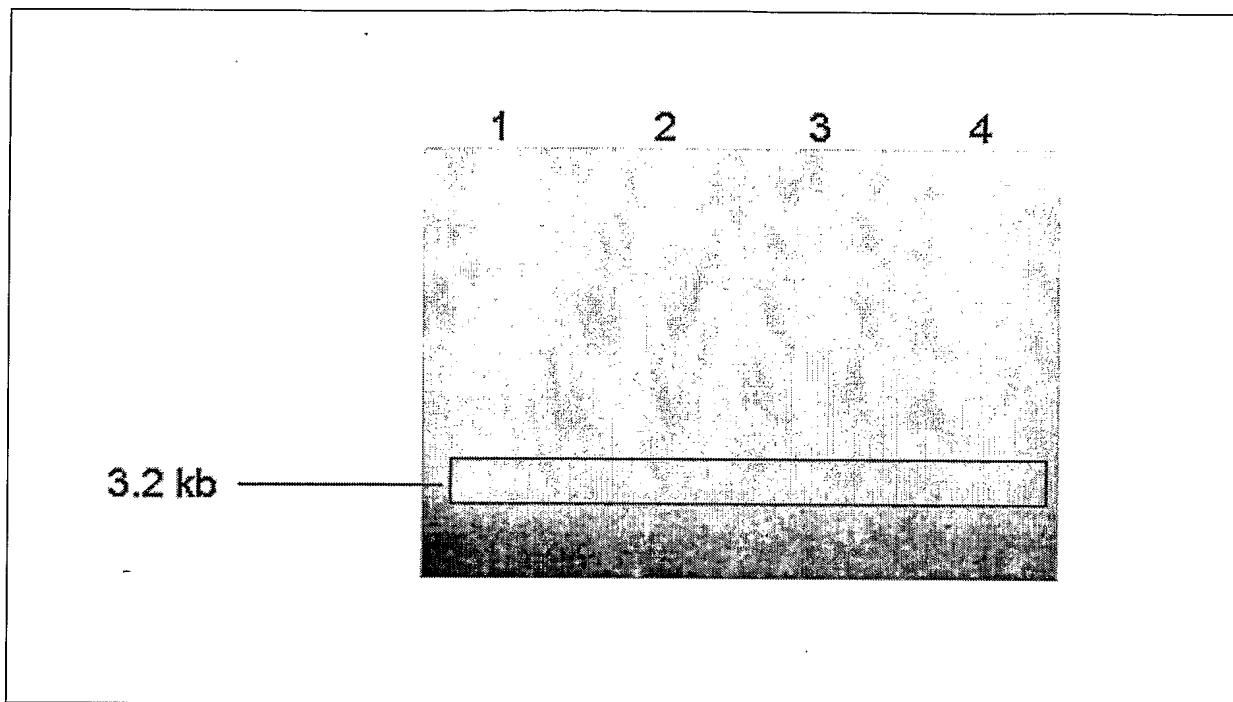
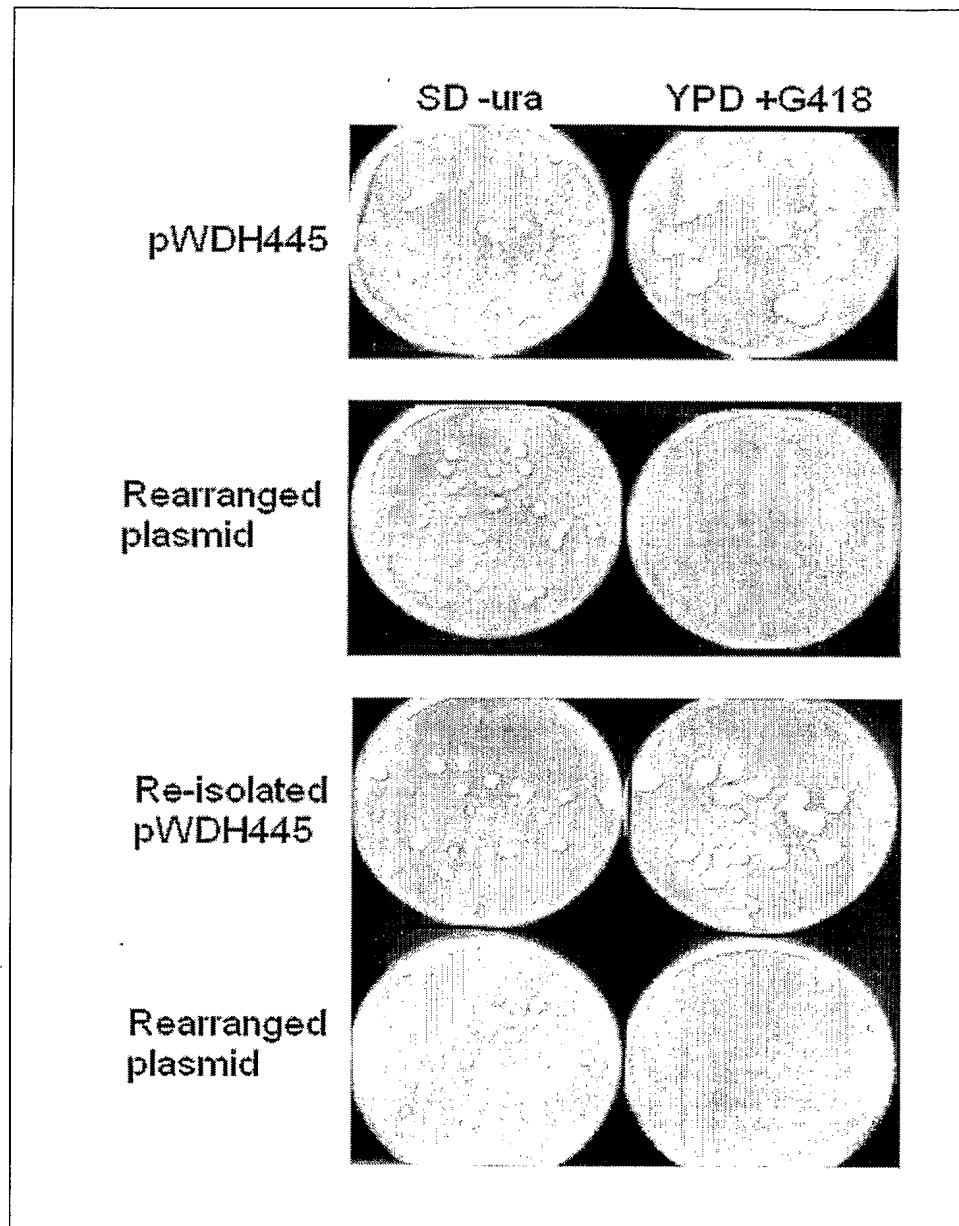


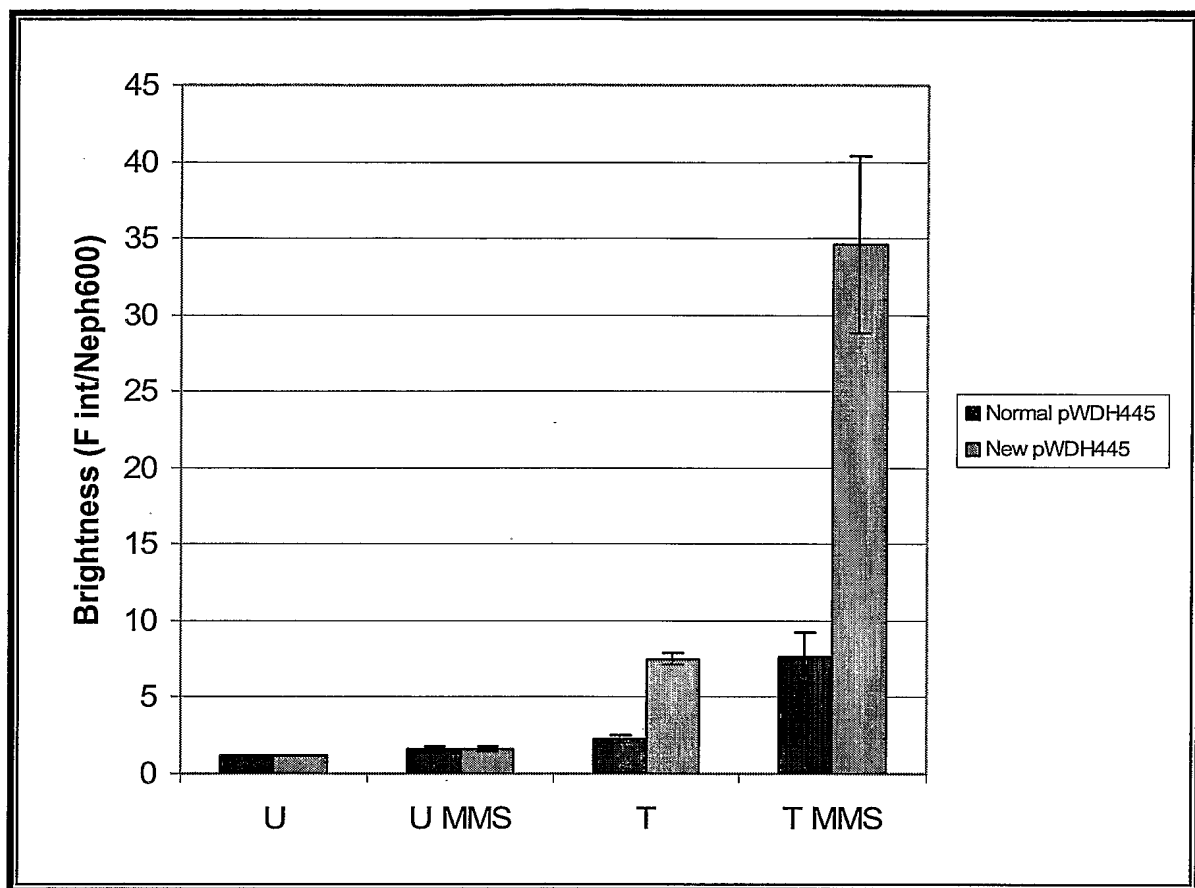
1/61FIG. 1

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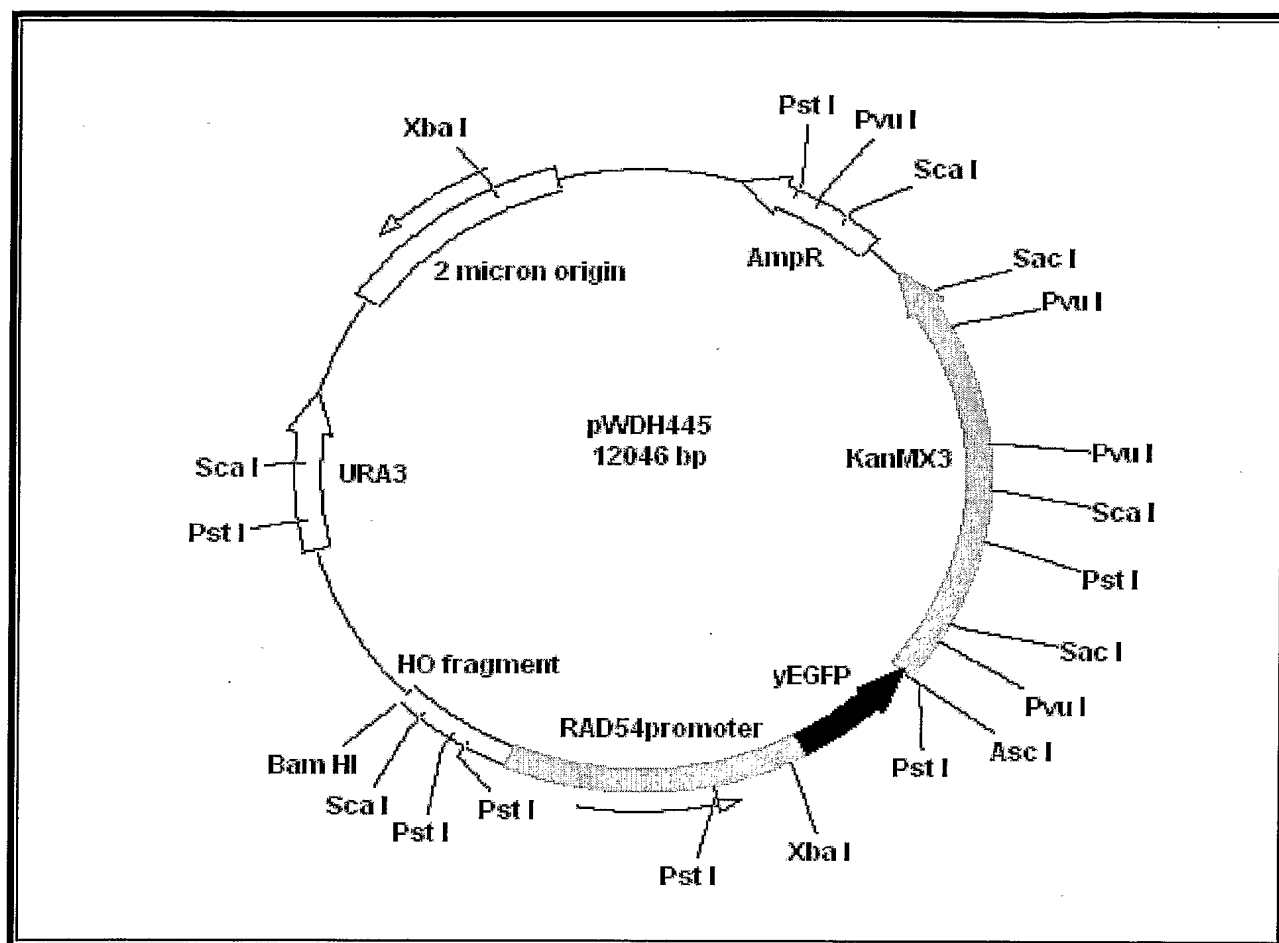
FIG.2

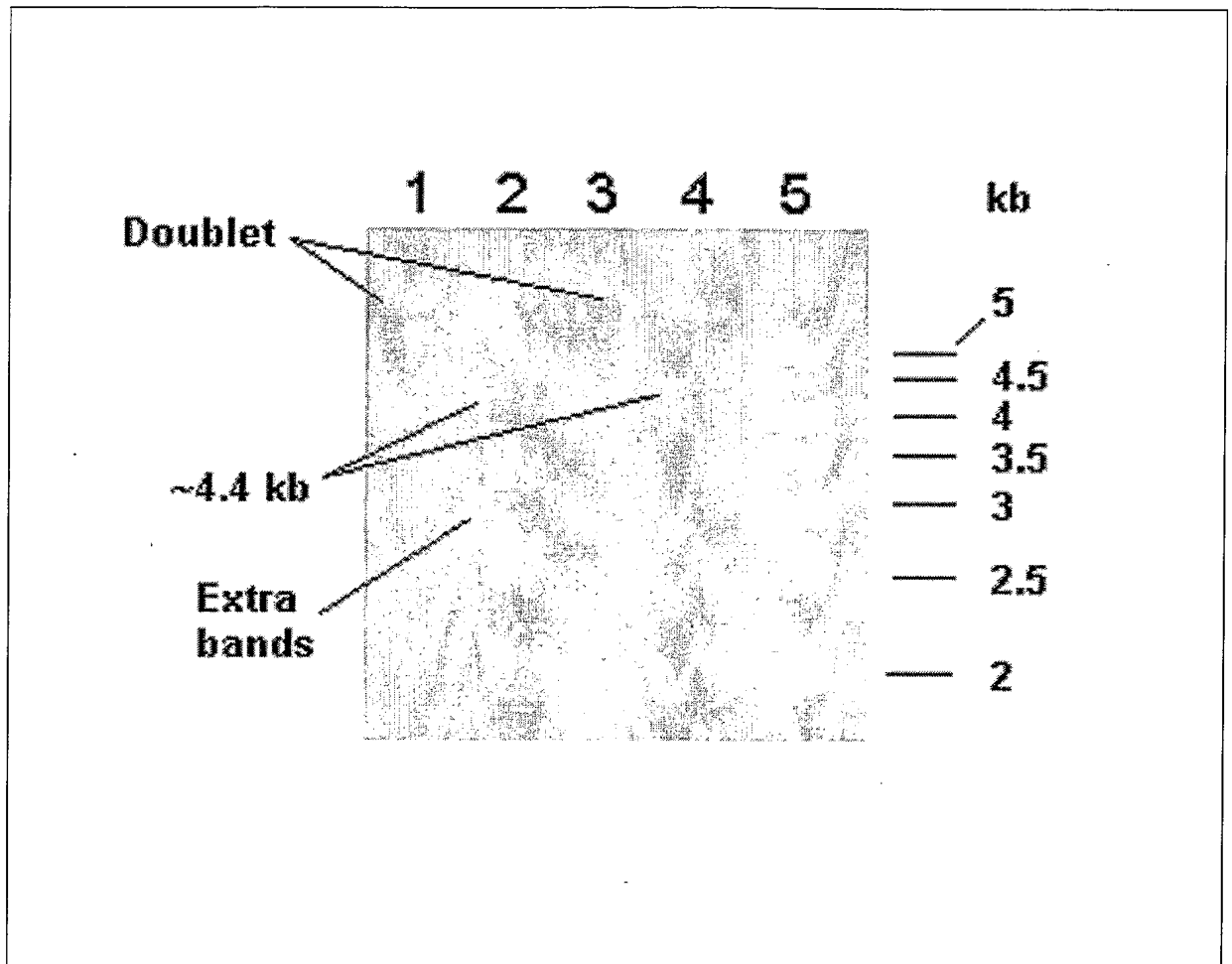


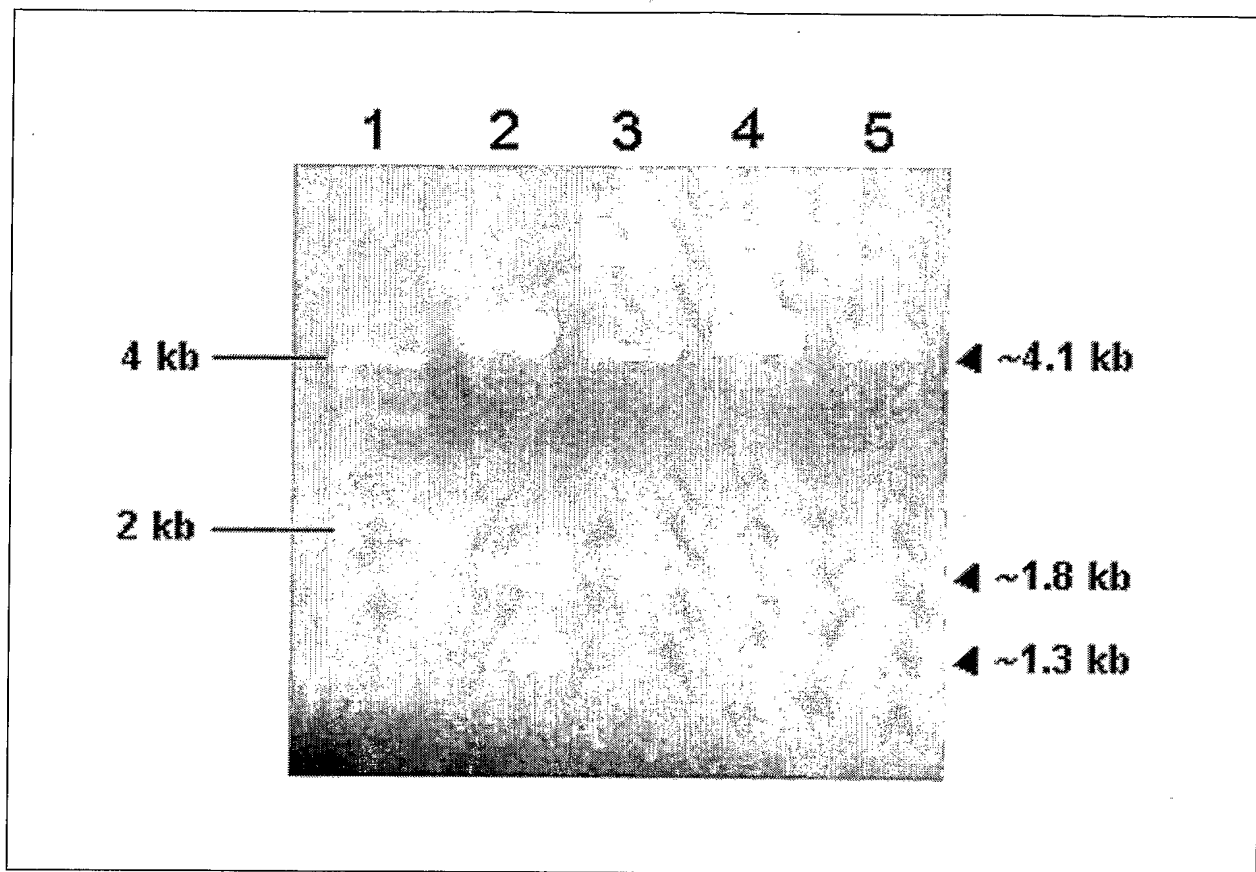
3/61**FIG. 3**

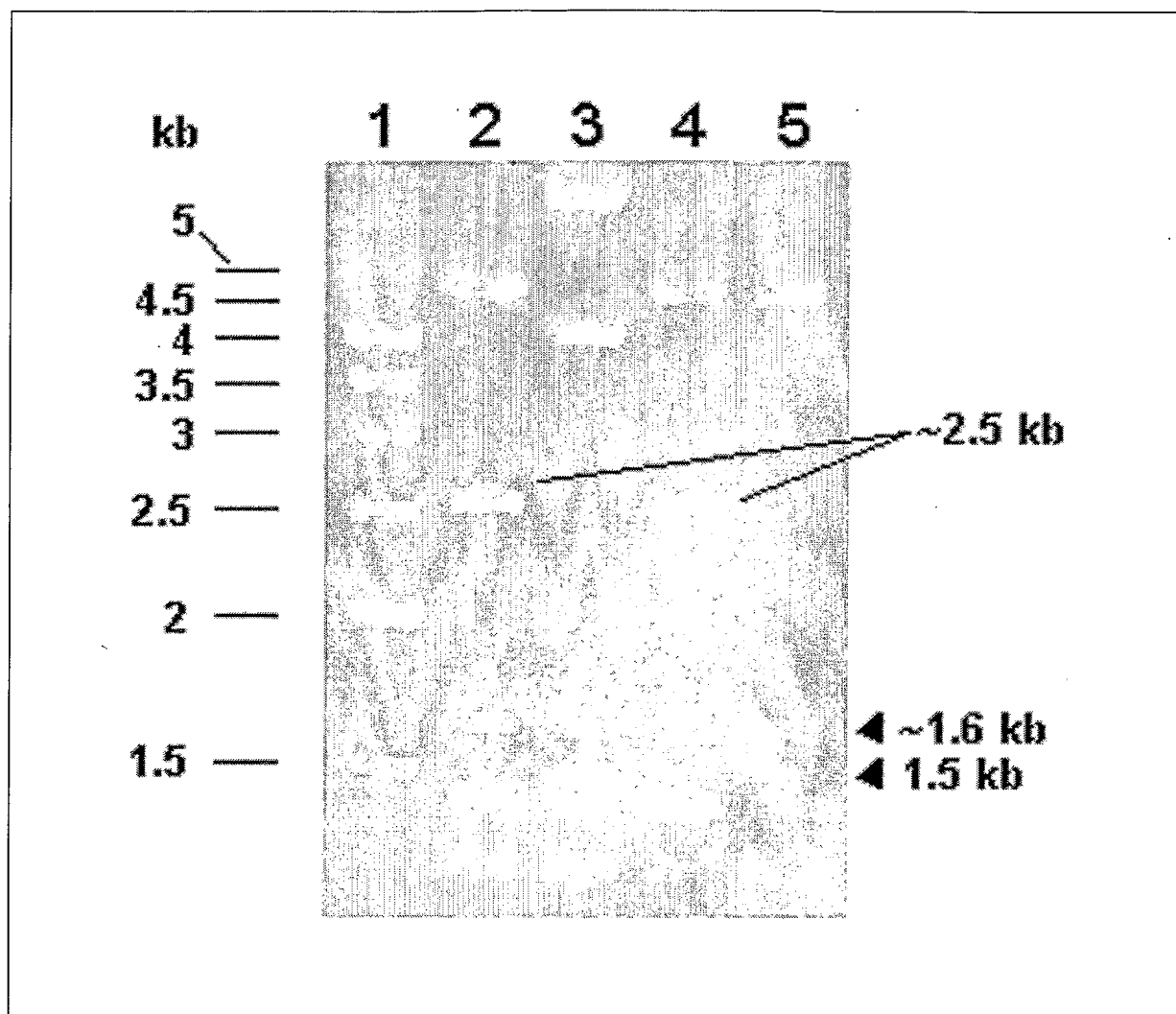
4/61**FIG. 4**

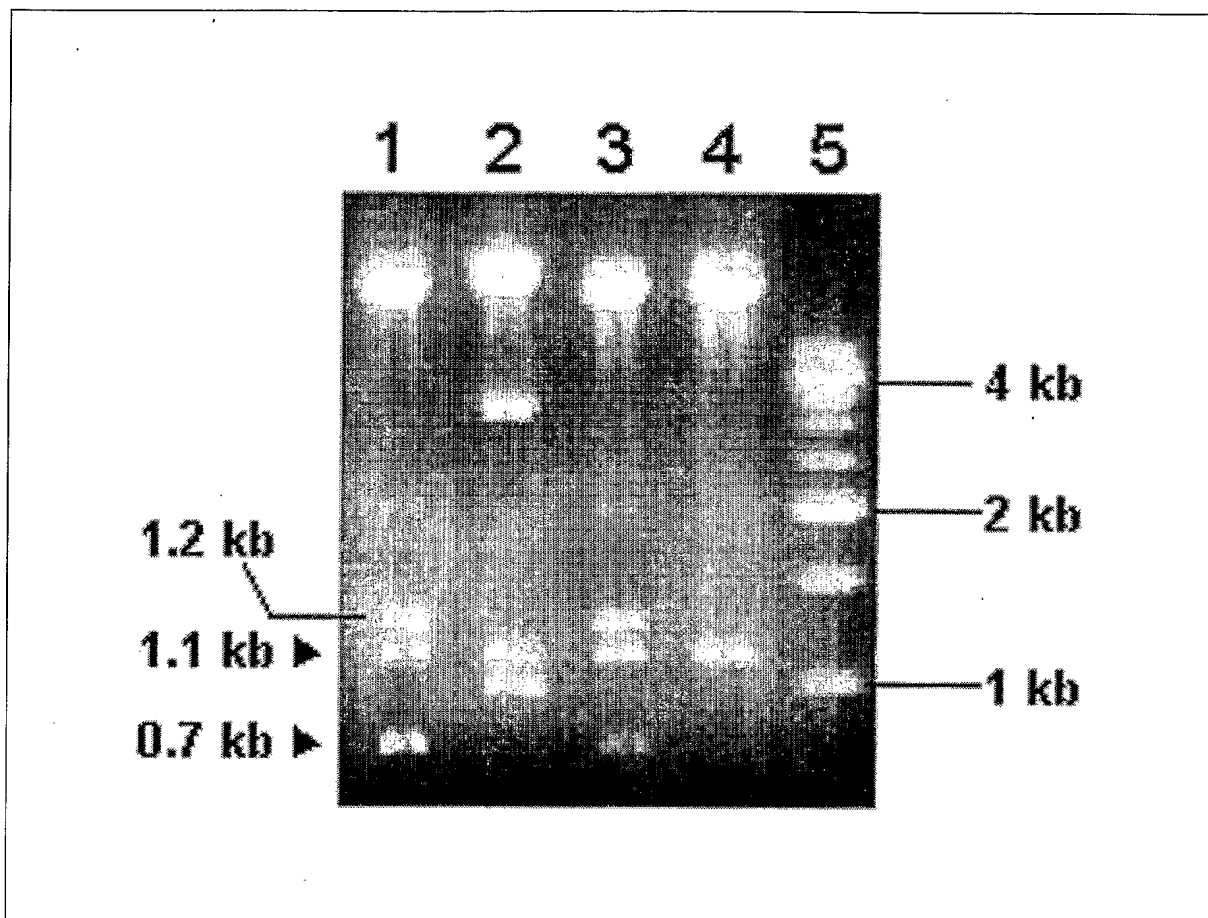
5/61

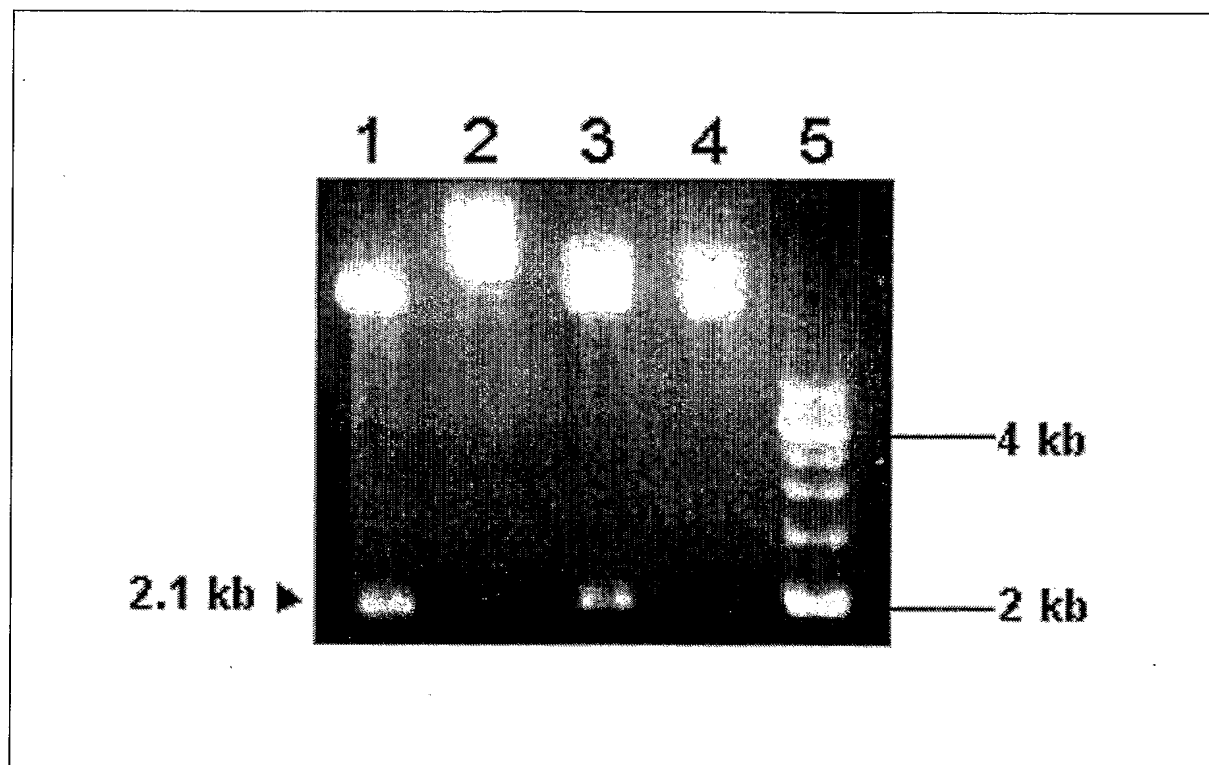
FIG. 5

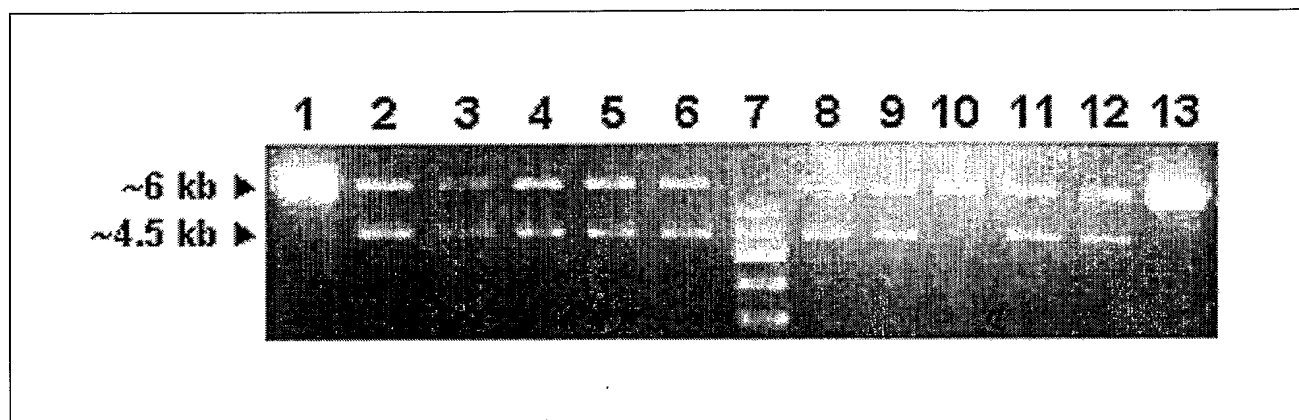
6/61**FIG. 6**

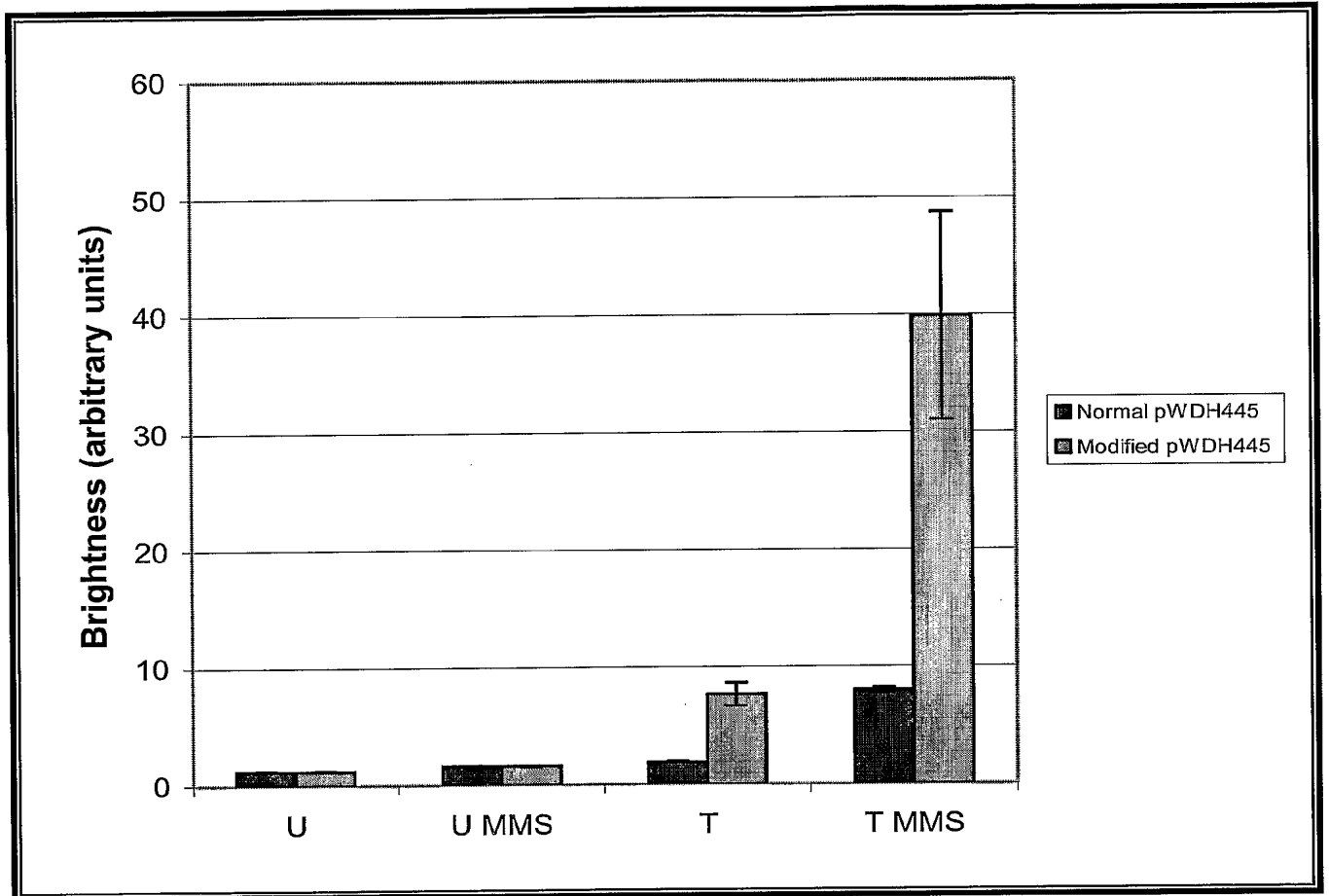
7/61**FIG. 7**

8/61**FIG. 8**

9/61**FIG.9**

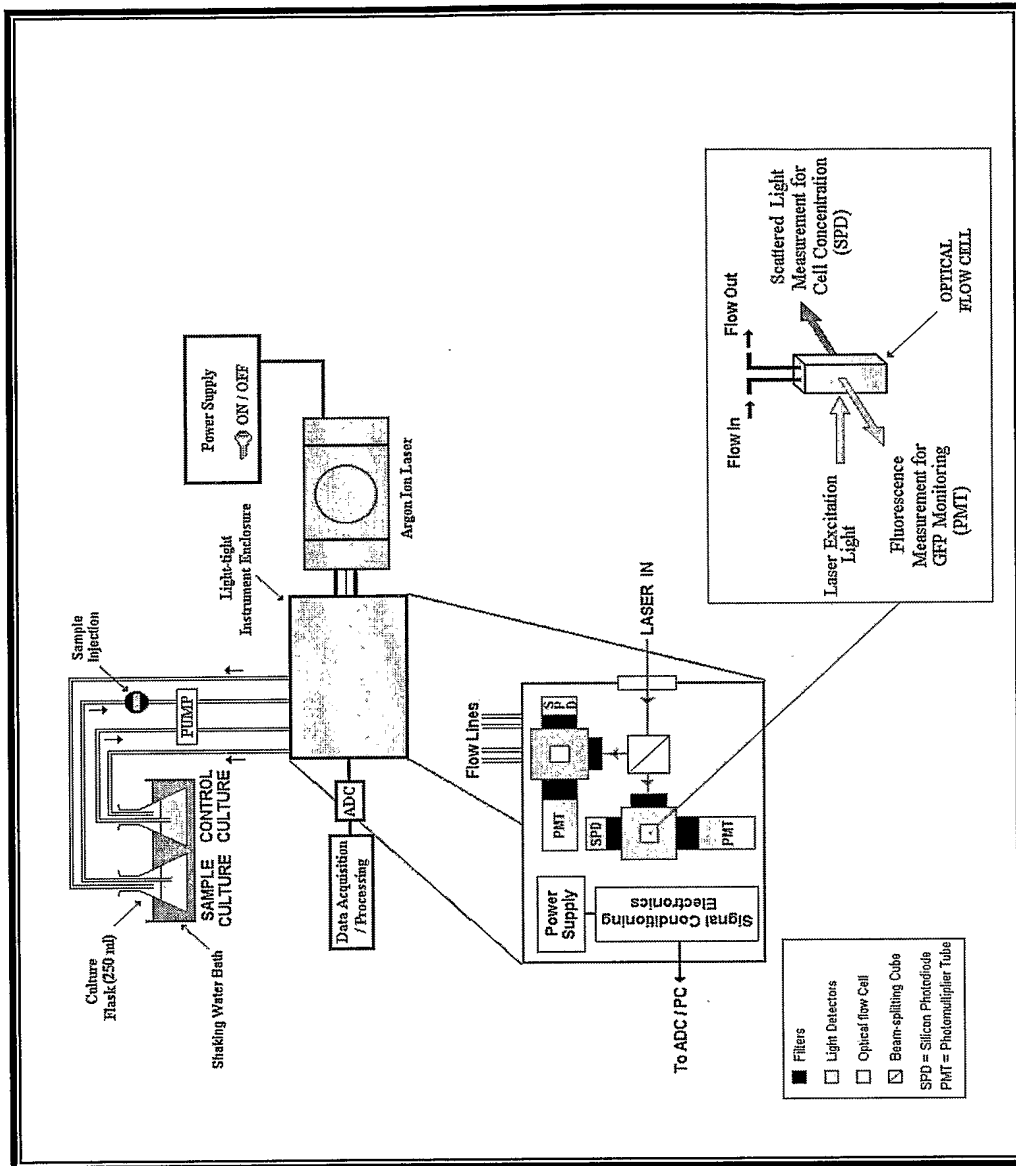
10/61**FIG. 10**

11/61FIG. 11

12/61**FIG. 12**

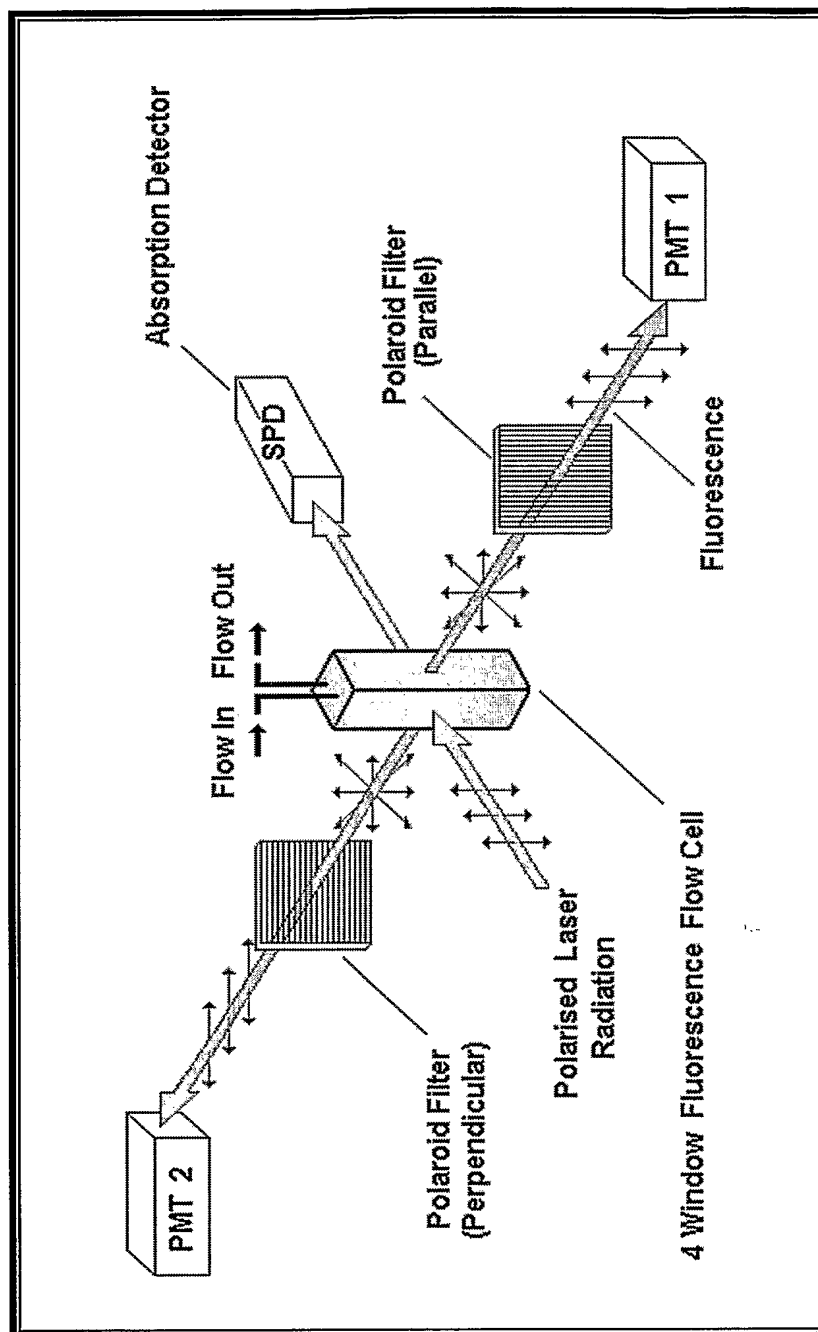
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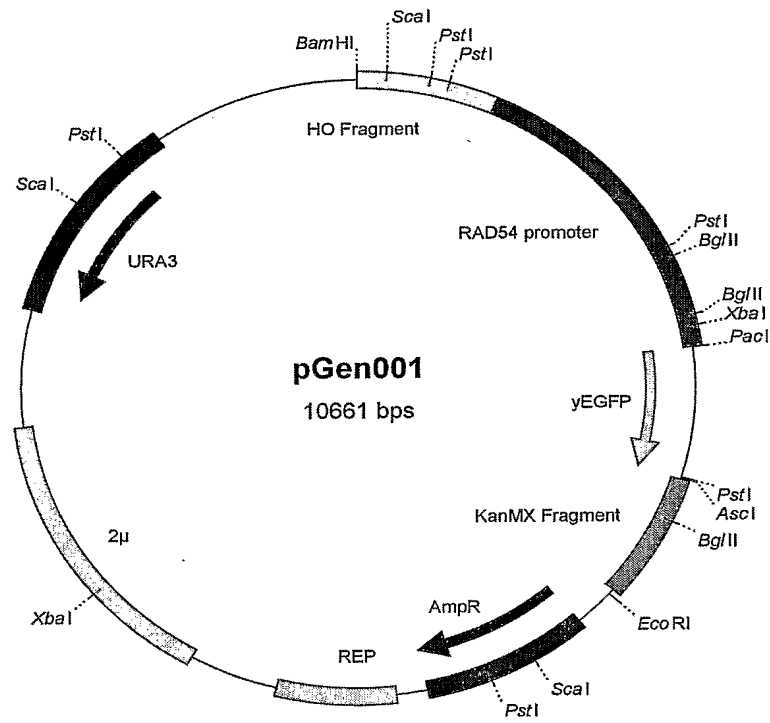
FIG. 13



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FIG. 14



15/61FIG. 15

16/61**FIG. 16**

Key:

HO sequence RAD54 Promoter *yEGFP* KanMX sequence AmpR REP 2 μ sequence
URA3

GATCCAAGCTATCTACTGAGATTTCTGGCTCTTTTGTGTGACTGTCACCTAACCACAGACCAAGCATCCAA
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TCACCTTCAACTGTCATTGGGAATGTCTTATGATGGTTTTTTGGAAATTATTATTATCCTACCATCAAGCGT
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CTACGCCTGGGATCTAACCTACCAGGTTACCTTCAAAGCTCTGTGTTTGGTTTTTTGTGTATATTATA
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17/61**Figure 16 continued**

ACTGCTGCTGGTATTACCCATGGTATGGATGAATTGTACAAATAACTGCAGGGCGCGCCACTTCTAAATAA
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CAGTGACGAAGGCTTGAAGGAGGGCGTGAAGATTCCGAATACCGCAAGCGACAGGCCGATCATGTCGCG
CTCCAGCGAAAGCGGTCTCGCCGAAATGACCCAGAGCGCTGCCGGCACCTGTCTACGAGTTGCATGAT

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AAAGAAGACAGTCATAAGTGCGGCGACGATAGTCATGCCCCGCGCCCACCGGAAGGAGCTGACTGGGTGA
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CCGGCGTAGAG

20/61**FIG. 17**

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1   GATCCAAGCT ATCTACTGAG ATTTCTGGCT CTTTGTGTGT ACTGTCACCT
51  AACCACAGAC CAAGCATCCA AGCCATACTT TTTACAGCAG GAGTTACAAG
101 GTCACTACGT CCAGTGAGAA ATTTAGATAA AACACCATTT CCTGCGAGTA
151 CTGGACCAAA TCTTATGCAG CTAGAAATTC TCAATTGAGC ATCAAGATAA
201 TCCAAATCTC TAACTTCAAT GTCAAAAGTTG AAATATTCTC CTTTAGAGCG
251 CTCCATTTCT TCTATGAAGC GTTTTGC GGC AACTCACCT TCAACTGTCA
301 TTGGGAATGT CTTATGATGG TTTTGTGGAA TTATTATTAT CCTACCATCA
351 AGCGTCTGAC ATTGCTGCAG ATTTCTCCAT CTCACTTTAT ATTTGGTGGC
401 ATTTCTACCA CTTTTTTCCTA ACAGTGGTTT GGTAGGGACC CTGACTGACA
451 ATTTATGACC TGCAGTACAT TGTAATGCAA GACGCTGATA AACTGTTCTA
501 CGCCTGGGAT CTAACCTACC AGGTTTACCT TCAAAAGCTC TGTGTTTGGT
551 TTTTGTGCTGT ATATTATAGA TTTTCTGATA GCCCTGTGTG ACATTTATGA
601 CGCGGGCAGC GGAGCCATCT GCGCACATAA CGTAAGAGTT AGCCGTGACG
651 TTTGCGATGT CTTTAATTTT ACCGTTAGCC ATCAGAATAG TCGTGTTTTC
701 AGAAGCATT TTGATCCGAC ATACGATGAC CTCAATGATT TAGATTATGT
751 GTTGCACTTT TATAGACCTA CCAAAAATCC AGTGCGTACA CTAATACTTT
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901 ATGAGTAAGG AAAATACAAG TGACGCTTTT ATATGGTGCA AGGAACAAAA
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1151 TTTTGTGGTC CAGTCTTTCT CATACTCGAG GGAAATTCGA CACAAACAGC
1201 GGAGAAGTGT GGCTAAACCG GCAAGTGCCT GCAAGATCCA CAGAACTAAC
1251 CGCACGAACG GCGGTCAGA AAAGAGCCTG TTCCGAAAG AGAGAAACAG
1301 AGAAACGATC ATGATGGGAA AGCGGGGATT CGGCGAAGAA CGGACTGGA
1351 AAGGGAAAAA GAGAAATACT GGTGGAAGTA TTCGGACCTT TGGCGAAGTC
1401 CGAACCCCTG AAACCCAAAG ATGATCGATG ATTCATTTTT CAATGCGCTA
1451 CGGTCTCTGC CGCTCGTGGG AACCCACGC AAAACATATT ATTCGCTTCT
1501 CTCTGCTGAC AACTCCGGTT TACGTTATAC CGTATTAGGA TCACTATAAG
1551 GGTTCTCTCG GGAGGAGGGG GGAGGGGAAG AATGTACATC GTCATAAGGC
1601 CTTTATGGTG TGAAGTGGGT TTTGCGTGGG AAATTCGTTT TCAATGATAT
1651 AGAGCCACG CATATACGTA CATACTAGTG GCCAAAAGCG TGGGGTGGGC
1701 GGACAAAGCT AACTGGTAA AATACAGGAT TCTATGAACA ATAACAACAA
1751 CCAGCTCACG TTGCTGAACA GCCGAGGTCA GCCGATGCAA CCGAGGTTTC
1801 CAAAGTAGCA TTTCTGTGCT AGCTATGTCT GTAGGTTTAC ATTTAATGGT
1851 GCGTGGTTCC AGCTTCATGT GCTTGCATGT GATGTCCTGC AGATGGTAAG
1901 AAGATTCTGA AAGCCGCGCT AGGAGAAAAA TATTCTGCTC GAAGATCTGT
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2001 CGCGTACGCA AATGCGTCTA CTGCACCTGC ATGATAAAGC TTATGTATCA
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2151 CCTCCGCCT TACTGCAATA ATAAAAAGTA TTTTACGCGT TACCAATAT
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2351 TTTCTTCACT AAAGCTGCTA CGAAAGTATA GAAAAATCAA ACGCTCAGAA
2401 CTTAGCTCTA TTTCAAGGTA CCATATATAT TTCCTTATAA CTGATGTTAA
2451 TTAACCTCTA AGGTGAAGAA TTATTCACTG GTGTTGTCCC AATTTTGGTT
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2651 GGTGTTCAAT GTTTTTCGAG ATACCCAGAT CATATGAAAC AACATGACTT
2701 TTTCAAGTCT GCCATGCCAG AAGGTTATGT TCAAGAAAGA ACTATTTTTT
2751 TCAAAGATGA CGGTAACACT AAGACCAGAG CTGAAGTCAA GTTTGAAGGT
2801 GATACCTTAG TTAATAGAAT CGAATTAAAA GGTATTGATT TTAAAGAAGA
2851 TGGTAACATT TTAGGTCACA AATTGGAATA CAACTATAAC TCTCACAATG
2901 TTTACATCAT GGCTGACAAA CAAAAGAATG GTATCAAAGT TAACTTCAAA
2951 ATTAGACACA ACATTGAAGA TGGTTCTGTT CAATTAGCTG ACCATTATCA
3001 ACAAATACT CCAATTGGTG ATGGTCCAGT CTTGTTACCA GACAACCATT
3051 ACTTATCCAC TCAATCTGCC TTATCCAAAG ATCCAAACGA AAAGAGAGAC
3101 CACATGGTCT TGTTAGAATT TGTTACTGCT GCTGGTATTA CCCATGGTAT
3151 GGATGAATTG TACAAATAAC TGCAGGGCGC GCCACTTCTA AATAAGCGAA
3201 TTTCTTATGA TTTATGATTT TTATTATTAA ATAAGTTATA AAAAAAATAA
3251 GTGTATACAA ATTTTAAAGT GACTCTTAGG TTTTAAAACG AAAATTCTTA
3301 TTCTTGAGTA ACTCTTTCCT GTAGGTCAGG TTGCTTTCCTC AGGTATAGTA
3351 TGAGGTCGCT CTTATTGACC ACACCTCTAC CGGCAGATCC GCTAGGGATA
3401 ACAGGGTAAT ATAGATCTGC CCGCCGGGAA GGCGAACCCG ATCGGATGCA
3451 TCCTCTCTGC TGCCATGATG CTGAAGTTGT CGTTGAACAT GGTTCGTGCC
3501 GGCGAGGCGG TCGAGCAGGC AGTGCAGGAG GTGTTGGACT CGGGGCTCAG
3551 AACGGGCGAC CTGCTCGGCT CGAGCTCCAC TTCGGAGGTT GGCGACGCCA
3601 TTGCGCTTGC AGTTAAGGAA GCCTTGCGCA GGCAATCCGC AGCTGGTCTG
3651 AGCTAGCCTC GAGGACCCTT CTCTTTAGAC TATTCTACTC TTATGCACGT
3701 AAAAAATTCT AGGAAATATG TATTAAGTAG GAGTAAAATA ACCGGCTAGT
3751 GGCATTCATA TAGCCGTCTG TTTACATCTA CATCACACAT TTCGAGTGTA
3801 TATCTCGCAA CGTTGGCGTT AAATAGGCAG TCAATGGCCC GACCATTCTA
3851 TGGTGTTTAG GTCGATGCCA TCTTTGTACG TTTAGCTTAT CGATGATAAG
3901 CTGTCAAACA TGAGAATTCT TGAAGACGAA AGGGCCTCGT GATACGCCTA
3951 TTTTTATAGG TTAATGTCAT GATAATAATG GTTTCTTAGA CGTCAGGTGG
4001 CACTTTTCGG GGAAATGTGC GCGGAACCCC TATTTGTTTA TTTTCTAAA
4051 TACATTCAAA TATGTATCCG CTCATGAGAC AATAACCCTG ATAAATGCTT
4101 CAATAATATT GAAAAAGGAA GAGTATGAGT ATTCACATT TCCGTGTCGC
4151 CCTTATTCCC TTTTTTGCGG CATTTTGCCT TCCTGTTTTT GCTCACCAG
4201 AAACGCTGGT GAAAGTAAAA GATGCTGAAG ATCAGTTGGG TGCACGAGTG
4251 GGTTACATCG AACTGGATCT CAACAGCGGT AAGATCCTTG AGAGTTTTCG
4301 CCCGAAGAA CGTTTTCCAA TGATGAGCAC TTTTAAAGTT CTGCTATGTG
4351 GCGCGGTATT ATCCCGTGTT GACGCCGGGC AAGAGCAACT CGGTCGCCGC
4401 ATACACTATT CTCAGAATGA CTTGGTTGAG TACTCACCAG TCACAGAAAA
4451 GCATCTTACG GATGGCATGA CAGTAAGAGA ATTATGCAGT GCTGCCATAA
4501 CCATGAGTGA TAACACTGCG GCCAACTTAC TTCTGACAAC GATCGGAGGA
4551 CCGAAGGAGC TAACCGCTTT TTTGCACAAC ATGGGGGATC ATGTAACCTG
4601 CCTTGATCGT TGGGAACCGG AGCTGAATGA AGCCATACCA AACGACGAGC
4651 GTGACACCAC GATGCCTGCA GCAATGGCAA CAACGTTGCG CAAACTATTA
4701 ACTGGCGAAC TACTTACTCT AGCTTCCCGG CAACAATTAA TAGACTGGAT
4751 GGAGGCGGAT AAAGTTGCAG GACCACTTCT GCGCTCGGCC CTTCCGGCTG
4801 GCTGGTTTAT TGCTGATAAA TCTGGAGCCG GTGAGCGTGG GTCTCGCGGT
4851 ATCATTGCAG CACTGGGGCC AGATGGTAAG CCCTCCCGTA TCGTAGTTAT
4901 CTACACGACG GGGAGTCAGG CAACTATGGA TGAACGAAAT AGACAGATCG
4951 CTGAGATAGG TGCCTCACTG ATTAAGCATT GGTAAGTGTG AGACCAAGTT
5001 TACTCATATA TACTTTAGAT TGATTTAAAA CTTATTTTTT AATTTAAAAA
5051 GATCTAGGTG AAGATCCTTT TTGATAATCT CATGACCAA ATCCCTTAAC
5101 GTGAGTTTTT GTTCCACTGA GCGTCAGACC CCGTAGAAAA GATCAAAGGA
5151 TCTTCTTGAG ATCCTTTTTT TCTGCGCGTA ATCTGCTGCT TGCAAACAAA
5201 AAAACCACCG CTACCAGCGG TGGTTTGTTT GCCGGATCAA GAGCTACCAA

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22/61**Fig 17 continued**

5251	CTCTTTTTTCC	GAAGGTAAC	GGCTTCAGCA	GAGCGCAGAT	ACCAAATACT
5301	GTCCTTCTAG	TGTAGCCGTA	GTTAGGCCAC	CACTTCAAGA	ACTCTGTAGC
5351	ACCGCCTACA	TACCTCGCTC	TGCTAATCCT	GTTACCAGTG	GCTGCTGCCA
5401	GTGGCGATAA	GTCGTGTCTT	ACCGGGTTGG	ACTCAAGACG	ATAGTTACCG
5451	GATAAGGCGC	AGCGGTCGGG	CTGAACGGGG	GGTTCGTGCA	CACAGCCCAG
5501	CTTGGAGCGA	ACGACCTACA	CCGAACGAG	ATACCTACAG	CGTGAGCTAT
5551	GAGAAAGCGC	CACGCTTCCC	GAAGGGAGAA	AGGCGGACAG	GTATCCGGTA
5601	AGCGGCAGGG	TCGGAACAGG	AGAGCGCACG	AGGGAGCTTC	CAGGGGGAAA
5651	CGCCTGGTAT	CTTTATAGTC	CTGTCGGGTT	TCGCCACCTC	TGACTTGAGC
5701	GTCGATTTTT	GTGATGCTCG	TCAGGGGGGC	GGAGCCTATG	GAAAAACGCC
5751	AGCAACGCGG	CCTTTTTTACG	GTTCTCTGGC	TTTTGCTGGC	CTTTTGCTCA
5801	CATGTTCTTT	CCTGCGTTAT	CCCCTGATT	TGTGGATAAC	CGTATTACCG
5851	CCTTTGAGTG	AGTGATACC	CTCGCCGCA	GCCGAACGAC	CGAGCGCAGC
5901	GAGTCAGTGA	GCGAGGAAGC	GGAAGAGCGC	CTGATGCGGT	ATTTTCTCCT
5951	TACGCATCTG	TGCGGTATTT	CACACCGCAT	ATGGTGCAT	CTCAGTACAA
6001	TCTGCTCTGA	TGCCGCATAG	TTAAGCCAGT	ATACACTCCG	CTATCGCTAC
6051	GTGACTGGGT	CATGGCTGCG	CCCCGACACC	CGCCAACACC	CGCTGACGCG
6101	CCCTGACGGG	CTTGTCTGCT	CCCGGCATCC	GCTTACAGAC	AAGCTGTGAC
6151	CGTCTCCGGG	AGCTGCATGT	GTCAGAGGTT	TTCACCGTCA	TCACCGAAAC
6201	GCGCGAGGCA	GAGCTTTGAA	GAAAAATGCG	CCTTATTCAA	TCTTTGCTAT
6251	AAAAAATGGC	CCAAAATCTC	ACATTGGAAG	ACATTTGATG	ACCTCATTTT
6301	TTTCAATGAA	GGGCCTAACG	GAGTTGACTA	ATGTTGTGGG	AAATTGGAGC
6351	GATAAGCGTG	CTTCTGCCGT	GGCCAGGACA	ACGTATACTC	ATCAGATAAC
6401	AGCAATACCT	GATCACTACT	TCGCACTAGT	TTCTCGGTAC	TATGCATATG
6451	ATCCAATATC	AAAGGAAATG	ATAGCATTGA	AGGATGAGAC	TAATCCAATT
6501	GAGGAGTGGC	AGCATATAGA	ACAGCTAAAG	GGTAGTGCTG	AAGGAAGCAT
6551	ACGATACCCC	GCATGGAATG	GGATAATATC	ACAGGAGGTA	CTAGACTACC
6601	TTTCACTCTA	CATAAATAGA	CGCATATAAG	TACGCATTTA	AGCATAAACA
6651	CGCACTATGC	CGTTCTTCTC	ATGTATATAT	ATATACAGGC	AACACGCAGA
6701	TATAGGTGCG	ACGTGAACAG	TGAGCTGTAT	GTGCGCAGCT	CGCGTTGCAT
6751	TTTTCGGAAGC	GCTCGTTTTT	GGAAACGCTT	TGAAGTTCCT	ATTCCGAAGT
6801	TCCTATTCTC	TAGAAAGTAT	AGGAACTTCA	GAGCGCTTTT	GAAAAACAAA
6851	AGCGCTCTGA	AGACGCACTT	TCAAAAAACC	AAAAACGCAC	CGGACTGTAA
6901	CGAGCTACTA	AAATATTGCG	AATACCGCTT	CCACAAACAT	TGCTCAAAAG
6951	TATCTCTTTG	CTATATATCT	CTGTGCTATA	TCCCTATATA	ACCTACCCAT
7001	CCACCTTTTC	CTCCTTGAAC	TTGCATCTAA	ACTCGACCTC	TACATTTTTT
7051	ATGTTTATCT	CTAGTATTAC	TCTTTAGACA	AAAAAATTGT	AGTAAGAACT
7101	ATTCATAGAG	TGAATCGAAA	ACAATACGAA	AATGTAAACA	TTTCCTATAC
7151	GTAGTATATA	GAGACAAAAT	AGAAGAAACC	GTTCATAATT	TTCTGACCAA
7201	TGAAGAATCA	TCAACGCTAT	CACTTTCTGT	TCACAAAGTA	TGCGCAATCC
7251	ACATCGGTAT	AGAATATAAT	CGGGGATGCC	TTTATCTTGA	AAAAATGCAC
7301	CCGCAGCTTC	GCTAGTAATC	AGTAAACGCG	GGAAGTGGAG	TCAGGCTTTT
7351	TTTATGGAAG	AGAAAATAGA	CACCAAAGTA	GCCTTCTTCT	AACCTTAACG
7401	GACCTACAGT	GCAAAAAGTT	ATCAAGAGAC	TGCATTATAG	AGCGCACAAA
7451	GGAGAAAAAA	AGTAATCTAA	GATGCTTTGT	TAGAAAAATA	GCGCTCTCGG
7501	GATGCATTTT	TGTAGAACAA	AAAAGAAGTA	TAGATTCTTT	GTTGGTAAAA
7551	TAGCGCTCTC	GCGTTGCATT	TCTGTTCTGT	AAAAATGCAG	CTCAGATTCT
7601	TTGTTTGAAA	AATTAGCGCT	CTCGCGTTGC	ATTTTTGTTT	TACAAAAATG
7651	AAGCACAGAT	TCTTCGTTGG	TAAAATAGCG	CTTTCGCGTT	GCATTTCTGT
7701	TCTGTAAAAA	TGCAGCTCAG	ATTCTTTGTT	TGAAAAATTA	GCGCTCTCGC
7751	GTTGCATTTT	TGTTCTACAA	AATGAAGCAC	AGATGCTTCG	TTCTGCGGTA
7801	AAGCTCATCA	GCGTGGTCTG	GAAGCGATT	ACAGATGTCT	GCCTGTTTCT
7851	CCGCGTCCAG	CTCGTTGAGT	TTCTCCAGAA	GCGTTAATGT	CTGGCTTCTG
7901	ATAAAGCGGG	CCATGTTAAG	GGCGGTTTTT	TCCTGTTTGG	TCACTGATGC

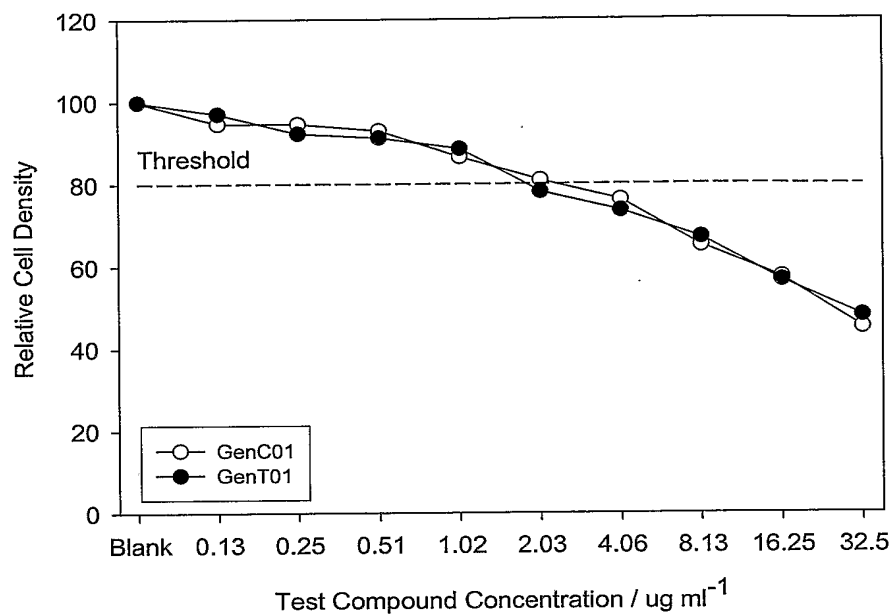
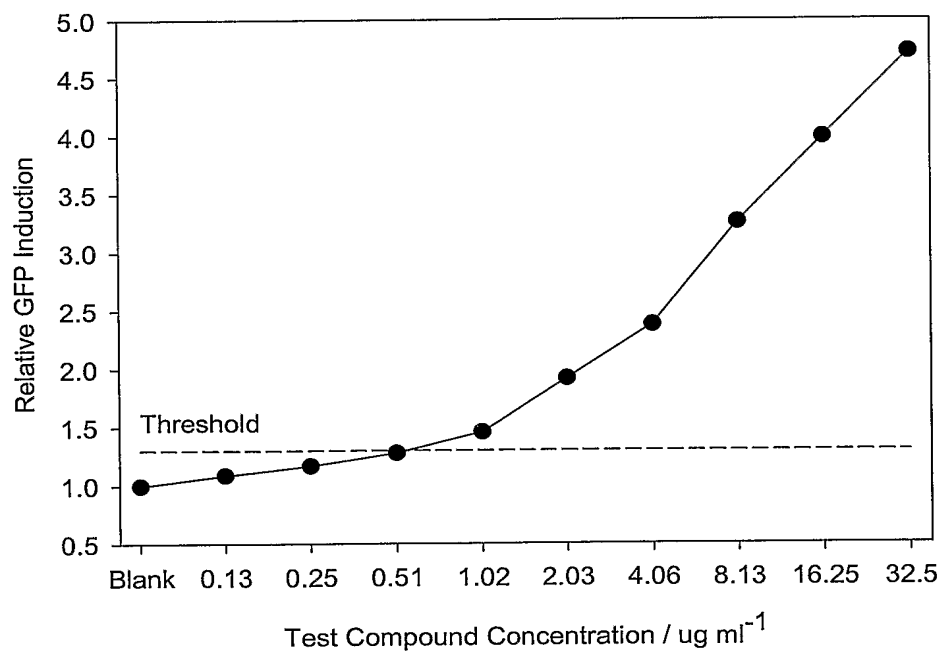
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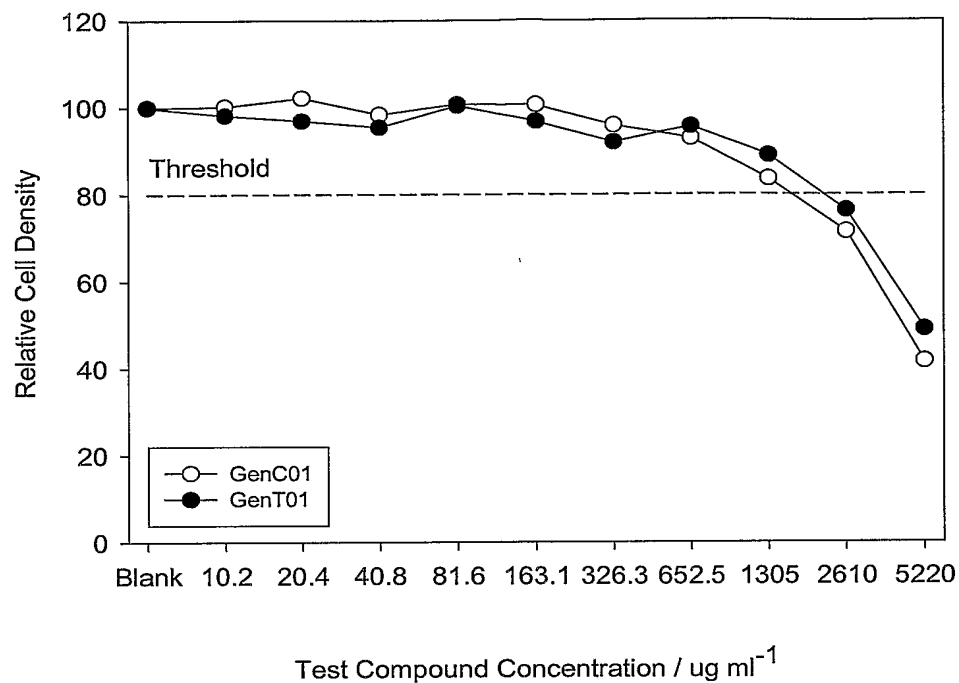
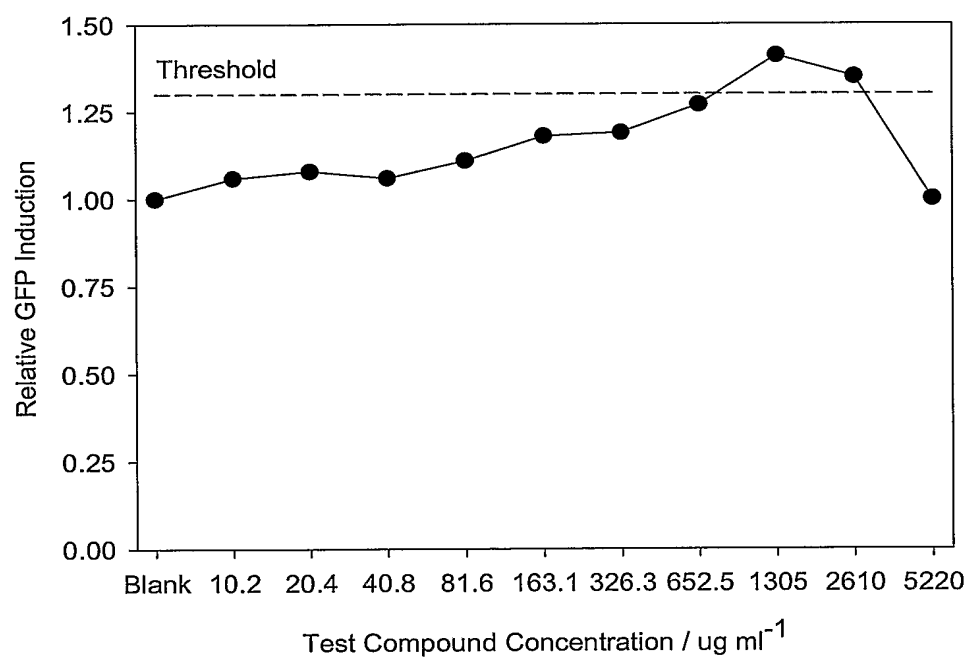
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7951 CTCCGTGTAA GGGGGATTTC TGTTTCATGGG GGTAATGATA CCGATGAAAC
8001 GAGAGAGGAT GCTCACGATA CGGGTTACTG ATGATGAACA TGCCCGGTTA
8051 CTGGAACGTT GTGAGGGTAA ACAACTGGCG GTATGGATGC GGCGGGACCA
8101 GAGAAAAATC ACTCAGGGTC AATGCCAGCG CTTCGTTAAT ACAGATGTAG
8151 GTGTTCCACA GGGTAGCCAG CAGCATCCTG CGATGCAGAT CCGGAACATA
8201 ATGGTGCAGG GCGCTGACTT CCGCGTTTTCC AGACTTTTACG AAACACGGAA
8251 ACCGAAGACC ATTCATGTTG TTGCTCAGGT CGCAGACGTT TTGCAGCAGC
8301 AGTCGCTTCA CGTTCGCTCG CGTATCGGTG ATTCATTCTG CTAACCAGTA
8351 AGGCAACCCC GCCAGCCTAG CCGGGTCCTC AACGACAGGA GCACGATCAT
8401 GCGCACCCCGT GGCCAGGACC CAACGCTGCG GGGGGGGGGG GGGTTTTCTT
8451 TCCAATTTTT TTTTTTTCGT CATTATAGAA ATCATTACGA CCGAGATTCC
8501 CGGGTAATAA CTGATATAAT TAAATTGAAG CTCTAATTTG TGAGTTTAGT
8551 ATACATGCAT TTACTTATAA TACAGTTTTT TAGTTTTGCT GGCCGCATCT
8601 TCTCAAATAT GCTTCCCAGC CTGCTTTTCT GTAACGTTCA CCCTCTACCT
8651 TAGCATCCCT TCCCTTTGCA AATAGTCCTC TTCCAACAAT AATAATGTCA
8701 GATCCTGTAG AGACCACATC ATCCACGGTT CTATACTGTT GACCCAATGC
8751 GTCTCCCTTG TCATCTAAAC CCACACCGGG TGTCATAATC AACCAATCGT
8801 AACCTTCATC TCTTCCACCC ATGTCTCTTT GAGCAATAAA GCCGATAACA
8851 AAATCTTTGT CGCTCTTCGC AATGTCAACA GTACCCTTAG TATATTCTCC
8901 AGTAGCTAGG GAGCCCTTGC ATGACAATTC TGCTAACATC AAAAGGCCTC
8951 TAGGTTCCCT TGTTACTTCT TCCGCCGCCT GCTTCAAACC GCTAACAATA
9001 CCTGGGCCCA CCACACCGTG TGCATTGTA ATGTCTGCCC ATTCTGCTAT
9051 TCTGTATACA CCCGCAGAGT ACTGCAATTT GACTGTATTA CCAATGTCAG
9101 CAAATTTTCT GTCTTCGAAG AGTAAAAAAT TGTACTTGGC GGATAATGCC
9151 TTTAGCGGCT TAACTGTGCC CTCCATGGAA AAATCAGTCA AGATATCCAC
9201 ATGTGTTTTT AGTAAACAAA TTTTGGGACC TAATGCTTCA ACTAATCCA
9251 GTAATTCCCT GGTGGTACGA ACATCCAATG AAGCACACAA GTTTGTTTGC
9301 TTTTCGTGCA TGATATTAAA TAGCTTGGCA GCAACAGGAC TAGGATGAGT
9351 AGCAGCACGT TCCTTATATG TAGCTTTCGA CATGATTTAT CTTCGTTTCC
9401 TGCAGGTTTT TGTTCTGTGC AGTTGGGTGA AGAATACTGG GCAATTTTCAT
9451 GTTTCTTCAA CACCACATAT GCGTATATAT ACCAATCTAA GTCTGTGCTC
9501 CTTCTTTCGT TCTTCTTCT GCTCGGAGAT TACCGAATCA AAAAAATTTT
9551 AAAGAAACCG GAATCAAAAA AAAGAACAAA AAAAAAAAG ATGAATTGAA
9601 ACCCCCCCCC CCCCCGATGC GCCGCGTGCG GCTGCTGGAG ATGGCGGACG
9651 CGATGGATAT GTTCTGCCAA GGGTTGGTTT GCGCATTAC AGTTCTCCGC
9701 AAGAATTGAT TGGCTCCAAT TCTTGGAGTG GTGAATCCGT TAGCGAGGTG
9751 CCGCCGGCTT CCATTCCAGG CGAGGTGGCC CGGCTCCATG CACCGCGACG
9801 CAACGCGGGG AGGCAGACAA GGTATAGGGC GGCGCCTACA ATCCATGCCA
9851 ACCCGTTCCA TGTGCTCGCC GAGGCGGCAT AAATCGCCGT GACGATCAGC
9901 GGTCCAGTGA TCGAAGTTAG GCTGGTAAGA GCCGCGAGCG ATCCTTGAAG
9951 CTGTCCCTGA TGGTCGTCAT CTACCTGCCT GGACAGCATG GCCTGCAACG
10001 CGGGCATCCC GATGCCGCCG GAAGCGAGAA GAATCATAAT GGGGAAGGCC
10051 ATCCAGCCTC GCGTCGCGAA CGCCAGCAAG ACGTAGCCCA GCGCGTCGGC
10101 CGCCATGCCG GCGATAATGG CCTGCTTCTC GCCGAAACGT TTGGTGGCGG
10151 GACCAGTGAC GAAGGCTTGA GCGAGGGCGT GCAAGATTCC GAATACCGCA
10201 AGCGACAGGC CGATCATCGT CGCGCTCCAG CGAAAGCGGT CCTCGCCGAA
10251 AATGACCCAG AGCGCTGCCG GCACCTGTCC TACGAGTTGC ATGATAAAGA
10301 AGACAGTCAT AAGTGCGGCG ACGATAGTCA TGCCCCGCGC CCACCGGAAG
10351 GAGCTGACTG GGTGAAGGC TCTCAAGGGC ATCGGTGCGC GCTCTCCCTT
10401 ATGCGACTCC TGCATTAGGA AGAGCCCGAG TAGTAGGTTG AGGCCGTTGA
10451 GCACCGCCGC GCAAGGAAT GGTGCATGCA AGGAGATGGC GCCCAACAGT
10501 CCCCCGGCCA CGGGGCCTGC CACCATAACC ACGCCGAAAC AAGCGCTCAT
10551 GAGCCCGAAG TGGCGAGCCC GATCTTCCCC ATCGGTGATG TCGGCGATAT
10601 AGGCGCCAGC AACCGCACCT GTGGCGCCGG TGATGCCGGC CACGATGCGT
10651 CCGGCGTAGA G

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24/61**FIG. 18****Cytotoxicity Profile:****Genotoxicity Profile:**

25/61**FIG. 19****Cytotoxicity Profile:****Genotoxicity Profile:**

GREEN SCREEN RESULTS

TEST COMPOUND	GenOM Strain			GenTH Strain			Test Range µg ml ⁻¹	Test Range mM	FP	Carcinogenicity	Ames Test	ML Test	UmuC Test	MNT inVITRO	MNT inVIVO	Chrom AbS
	CAS No.	Cytotoxicity	LEC / µg ml ⁻¹	GenTox	GenTox	LEC / µg ml ⁻¹										
2-Acetylaminofluorene	59-06-2	++	26.8	-	-	115	0.82	+			+/-(MA)	+	+	+	+	+
Acetylsalicylic Acid	50-76-2	-	-	-	867	4.81	+				-	-	-	-	-	+
Acetophenone D	50-76-0	+	62.5	-	500	0.40	+				-	+	-	+/+	+	+
Acetyloxyaniline	5927-99-3	+	56.3	-	112.5	0.50	+				-	+	-	-	-	+
9-Aminoanthracene	90-45-8	++	8	-	128	0.55	+				+/+	+	+	+	+	+
2-Aminoanthracene	613-13-8	++	14.25	-	57	0.29	+				+/-(MA)	+	+	+	+	+
2-Amino-4-nitrophenol	99-57-0	++	19.25	++	77	0.50	+	9.6		+/-(MA)	+	+	+	+	+	+
4-Aminophenol	123-30-8	-	-	-	504	4.52	+				-	+	+	+	+	+
3-Amino-1,2,4-Triazole	61-82-5	+	840	+	840	9.99	+	840		+/+	-	-	-	-	-	-
Ampicillin (Na salt)	69-52-3	-	69.52.3	-	8000	22.9	+				-	-	-	-	-	-
Aniline	62-53-3	++	2853	++	20420	219.3	+			+/+	+	+	+	+	+	+
o-Anisidine	90-04-0	++	14.2	++	437	3.55	+			+/+	+	+	+	+	+	+
Aphidicolin	30805-21-1	+	20	+	20	0.06	+	20		-	-	-	-	-	-	-
Arac	147-94-1	-	-	-	1400	5.76	+			-	+	+	+	+	+	+
5-Azacytidine	320-57-2	++	525	++	1250	5.12	+	625		+/+	+	+	+	+	+	+
AZT	30576-97-1	+	367.6	+	7350	27.5	+			+/+	+	+	+	+	+	+
Benzaldehyde	100-52-7	++	2625	++	5220	49.2	+	1313		+/+	+	+	+	+	+	+
Benzobiphenylene	50-32-8	-	-	-	26	0.10	+			-	+	+	+	+	+	+
Benzyl Chloride	98-98-1	++	1616	++	12120	86.22	+	304		+/+	+	+	+	+	+	+
Bismuth Sulfide	9001-93-4	++	5	++	5	0.0036	+	2.5		+/+	+	+	+	+	+	+
Cadmium Chloride	10108-64-2	++	2	++	2	0.041	+			+/+	+	+	+	+	+	+
Calcitriol	59-08-2	++	266	++	531	2.73	+			+/+	+	+	+	+	+	+
Catechol	120-80-6	++	177	++	660	7.99	+	599		+/+	+	+	+	+	+	+
Cefotaxime	64465-93-1	++	238	++	238	0.50	+	238		+/+	+	+	+	+	+	+
Chlorambucil	305-03-3	+	125	+	250	0.82	+			+/+	+	+	+	+	+	+
Chloramphenicol	56-76-7	+	162	+	162	0.50	+	10.1		+/+	+	+	+	+	+	+
Chromomycin A3	7059-24-7	-	-	-	10	0.0085	+			-	+	+	+	+	+	+
Cimetidine	51481-61-9	+	125	+	125	0.50	+	31.3		-	+	+	+	+	+	+
Cisplatin (without DMSO)	15663-27-1	++	2.34	++	130	0.50	+	18.75		+/+	+	+	+	+	+	+
Colditricin	64-96-9	-	-	-	893	2.14	+	427		+/+	+	+	+	+	+	+
Colonialdehyde	4170-30-3	++	26.5	++	1692	24.1	+	85.2		+/+	+	+	+	+	+	+
Cumene Hydroperoxide	80-15-9	++	65.4	++	519	3.41	+			+/+	+	+	+	+	+	+
Cycloheximide	66-61-9	++	0.03	++	1	0.0036	+			+/+	+	+	+	+	+	+
Dactinomycin	23541-50-6	++	0.5	++	290	0.44	+	0.25		+/+	+	+	+	+	+	+
2,3,5-Dichlorophenol	591-35-5	++	12.5	++	25	0.15	+			+/+	+	+	+	+	+	+
Dibutyl Peroxide	80-43-3	++	0.3	++	0.3	0.0011	+			+/+	+	+	+	+	+	+
Disulfiram	60-57-1	-	19.8	-	39.6	0.10	+			+/+	+	+	+	+	+	+
Diethylamine-4-methylcoumarin	91-44-1	++	59	++	118	0.51	+			+/+	+	+	+	+	+	+
1,2-Dimethylhydrazine HCl	306-37-6	++	330	++	1330	10.00	+	665		+/+	+	+	+	+	+	+
Emonazole Nitrate	24169-02-6	++	25	++	50	0.11	+	2.5		+/+	+	+	+	+	+	+
Eupilipone	519-23-3	++	4.39	++	562	2.28	+	12.5		+/+	+	+	+	+	+	+
1,2-Epoxybutane	106-68-7	+	8370	+	16740	232	+	16740		+/+	+	+	+	+	+	+
Ethidium Bromide	1239-45-8	-	-	-	12.5	0.032	+	6.25		+/-(MA)	+/+	+/+	+/+	+/+	+/+	+/+
7-Ethoxycoumarin	31005-02-4	-	-	-	129	0.68	+	32.3		+/-(MA)	+/+	+/+	+/+	+/+	+/+	+/+
Ethyl Acrylate	100-88-5	++	4605	++	18420	184.0	+			+/+	+	+	+	+	+	+
Ethylacetylstyrene	107-15-3	-	224.8	-	460	7.49	+			+/+	+	+	+	+	+	+

[illegible]

Chemical	62-56-6	++	10050	20100	264	++	1256	5000	65.7		+		=	+/-	
Thiourea	62-56-6														
Titanium Dioxide	13463-67-1	-		179	2.24	-		179	2.24		+/-			=	+
Trichloroacetonitrile	545-06-2	++	3.6	23.8	0.20	++	1.5	23.8	0.20				+/-		-
Trifluorophosphate	1330-78-5	-		572	1.55	++	143	572	1.55						
Urethane	51-79-6	++	10300	20600	231	++	10300	10300	115.60		+			+	+
Vanillin	121-33-5	++	21.25	170	1.12	-		162	1.00						
Vinblastine	143-67-9	++	62.5	250	0.28	-		250	0.28						+

KEY

-	Negative
+	Positive
++	Strong Positive
+/+	Results vary between reports
MA	Metabolic activation required to obtain positive result.
LEC	Lowest effective concentration
FP	Fluorescence polarisation used to reveal the result.
(p)	Polyploid problems increase significantly

FIG.21

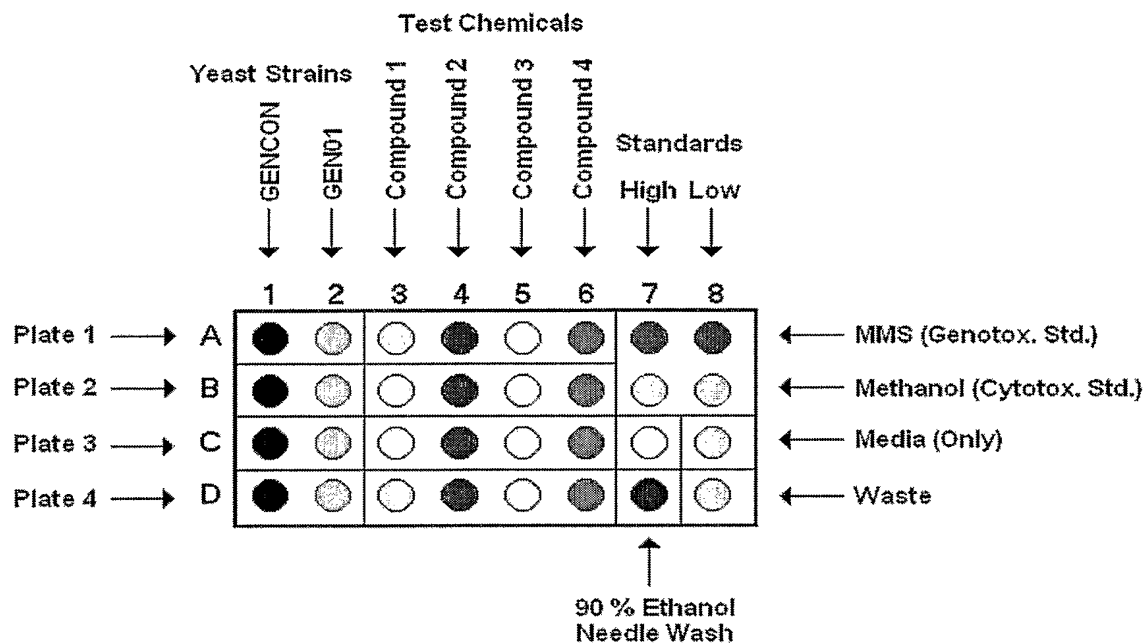
TEST COMPOUND	GSA	Ames	S9	TEST COMPOUND	GSA	Ames	S9
2-Amino-4-nitrophenol	++	+	+	2-Acetamidofluorene	-	+	+
Ethidium Bromide	++	+	+	2-Aminoanthracene	-	+	+
Neutral Red	++	+	+	o-Anisidine	-	+	+
Proflavin Hemisulfate	++	+	+	8-Hydroxyquinoline	-	+	+
5-Azacytidine	++	+	-	Isobutyl Nitrite	-	+	+
Bleomycin Sulfate	++	+	-	N-Nitrosodiphenylamine	-	+	+
Crotonaldehyde	++	+	-	9-Aminoacridine	-	+	-
Daunorubicin	++	+	-	Chlorambucil	-	+	-
Ellipticine	++	+	-	Cumene Hydroperoxide	-	+	-
Ethyl methanesulfonate	++	+	-	Hydroquinone	-	+	-
Furazolidone	++	+	-	ICR191 Acridine Mutagen	-	+	-
Hydrazine monohydrate	++	+	-	Nitrofurantoin	-	+	-
Hydroxyurea	++	+	-	N-Nitrosodimethylamine	-	+	-
Methyl methanesulfonate	++	+	-	4,4'-Oxydianiline	-	+	-
MNNG	++	+	-	Quercetin	-	+	-
Nalidixic Acid	++	+	-	Sodium Selenite	-	+	-
4-Nitroquinoline-N-oxide	++	+	-	Acetylsalicylic Acid	-	-	
N-Nitroso-N-ethyl urea	++	+	-	Actinomycin D	-	-	
N-Nitroso-N-methyl urea	++	+	-	4-Aminophenol	-	-	
Sodium Azide	++	+	-	Ampicillin (Na salt)	-	-	
Streptonigrin	++	+	-	Aniline	-	-	
Trichloroacetonitrile	++	+	-	AraC	-	-	
Benzo(a)pyrene	+	+	+	AZT	-	-	
1-Naphthylamine	+	+	+	Cadmium Chloride	-	-	
Benzoyl Chloride	+	+	-	Caffeine	-	-	
Cisplatin (without DMSO)	+	+	-	Chromomycin A3	-	-	
1,2-Epoxybutane	+	+	-	Cycloheximide	-	-	
Hexamethylenetetramine	+	+	-	3,5-Dichlorophenol	-	-	
Hydrogen Peroxide	+	+	-	Dicumyl Peroxide	-	-	
Mechlorethamine HCl	+	+	-	Dieldrin	-	-	
Mitomycin C	+	+	-	Diethylamino-4-methylcoumarin	-	-	
3-Amino-1,2,4-triazole	+	-		Ethyl Acrylate	-	-	
Aphidicolin	+	-		Ethylenediamine	-	-	
Benzaldehyde	+	-		Methyl Carbamate	-	-	
Colchicine	+	-		Methyl Methacrylate	-	-	
Etoposide	+	-		Nicotine	-	-	
Methyl viologen	+	-		Nitrobenzene	-	-	
Psoralen	+	-		Phenol	-	-	
Catechol	++	-		Sulfisoxazole	-	-	
Chloramphenicol	++	-		Taxol	-	-	
1,2-Dimethylhydrazine HCl	++	-		Tetracycline HCl	-	-	
Econazole Nitrate	++	-		Titanium Dioxide	-	-	
Methapyrilene HCl	++	-		Vanillin	-	-	
Phthalic acid bis(2-ethylhexyl) ester	++	-		Vinblastine	-	-	
Safrrole	++	-					
Sulfamethoxazole	++	-					
Thiourea	++	-					
Tritolyl Phosphate	++	-					
Urethane	++	-					

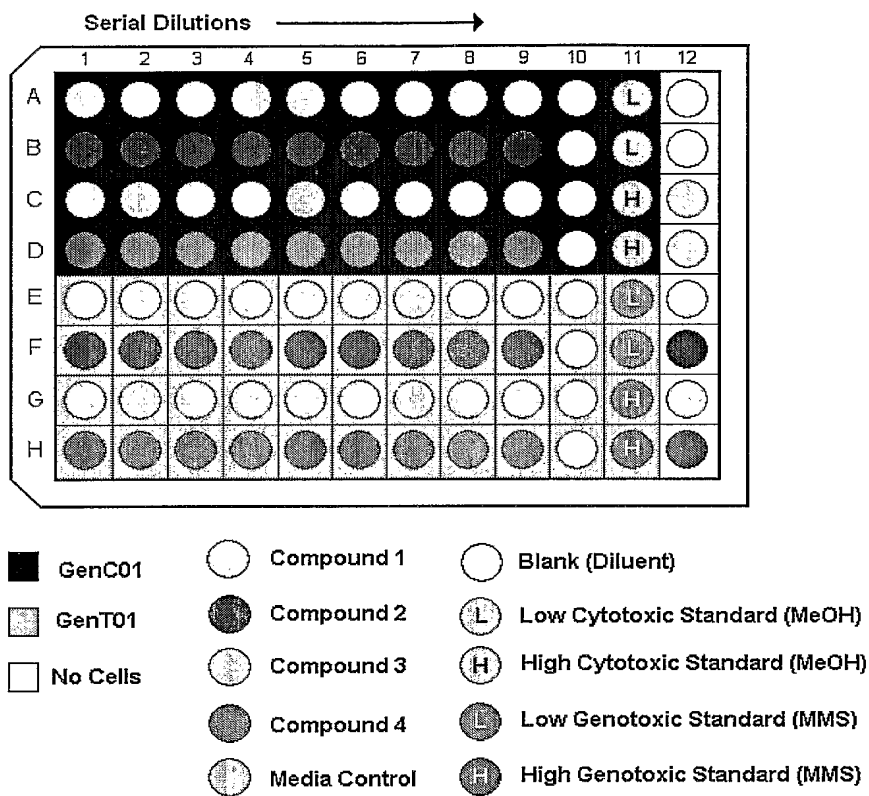
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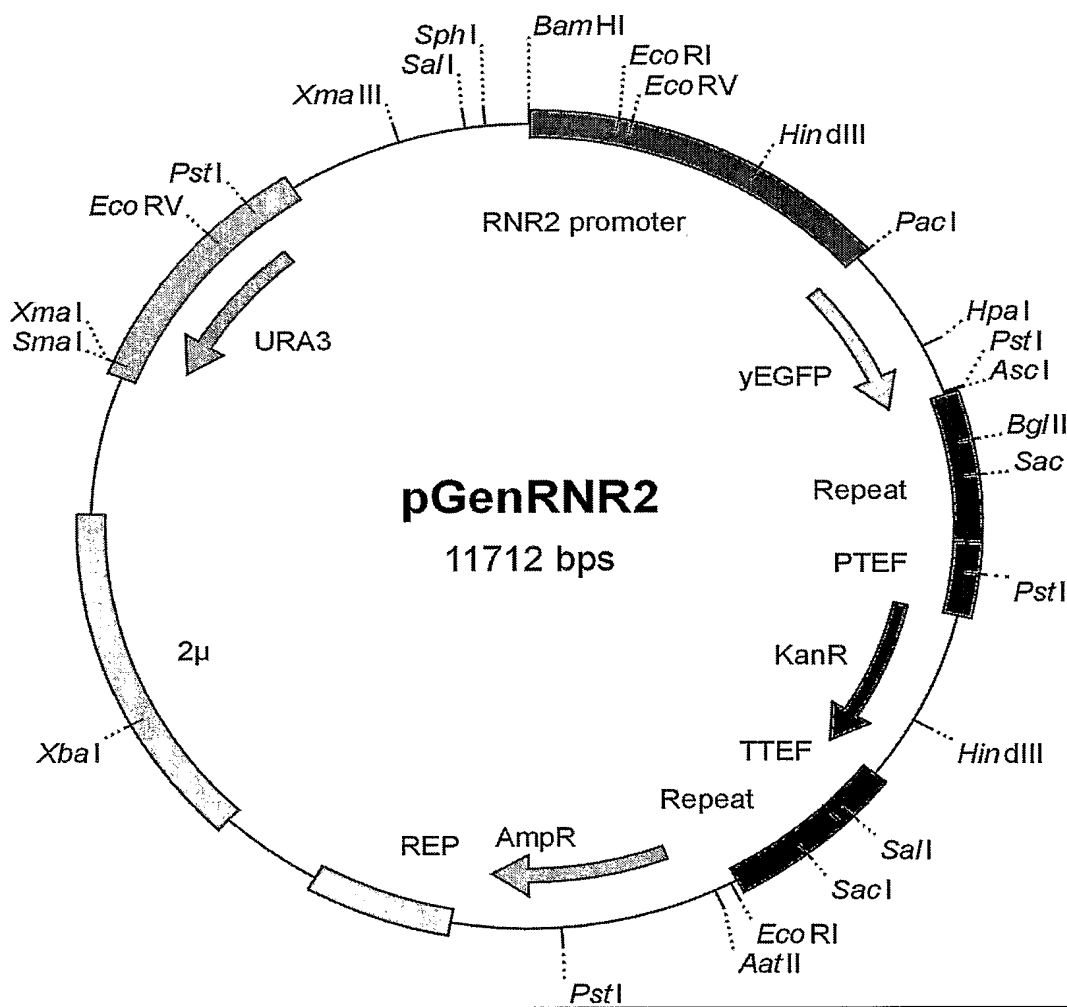
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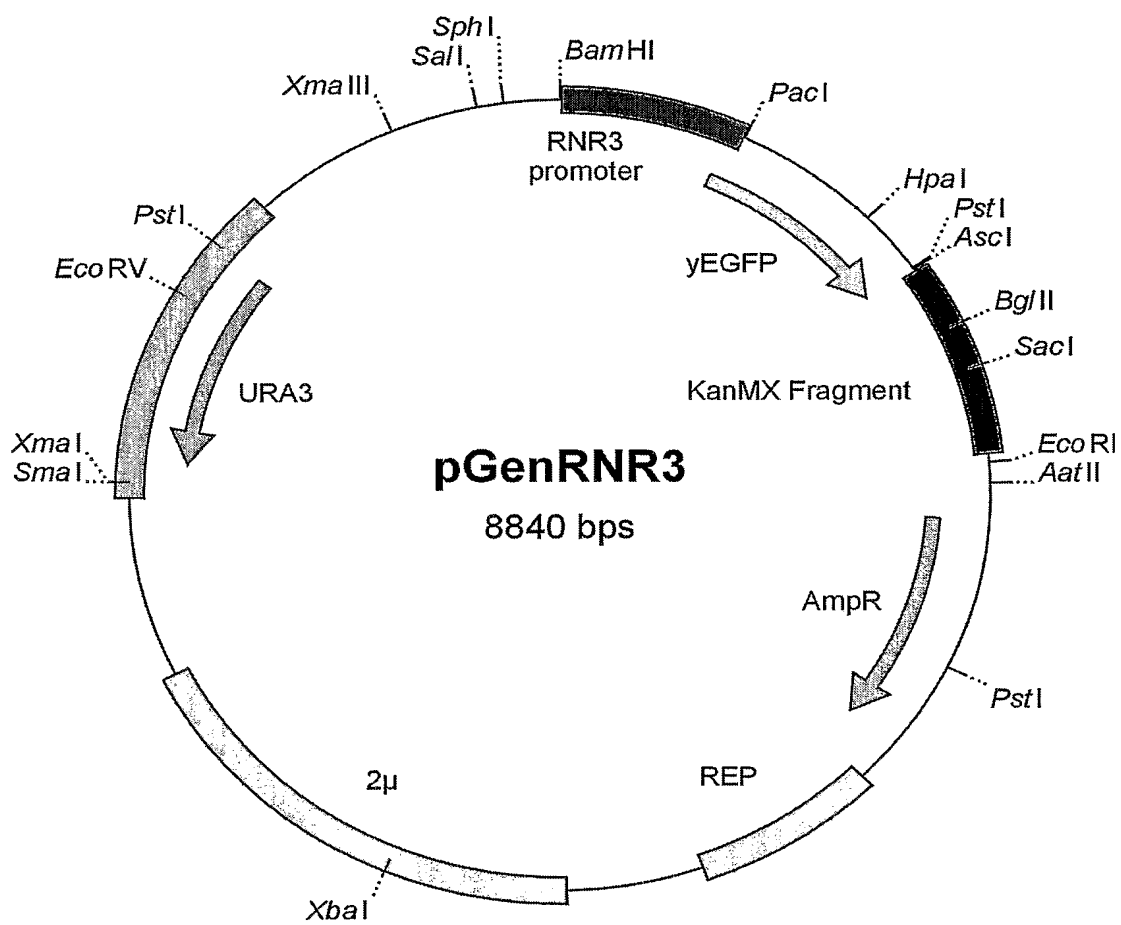
- S9 not required

Table 3

30/61FIG. 22**Greenrack loading sequence**

31/61**FIG. 23****Microplate layout**

32/61FIG. 24

33/61**FIG. 25**

34/61**FIG. 26**

pGenRNR2

GGATCCGTACCTTCCAGCATTGTCCTTCTGAGAAAACAAAAATGGAAGATGTTGTGAAAATGCAGTAAGTGA
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PGenRNR3

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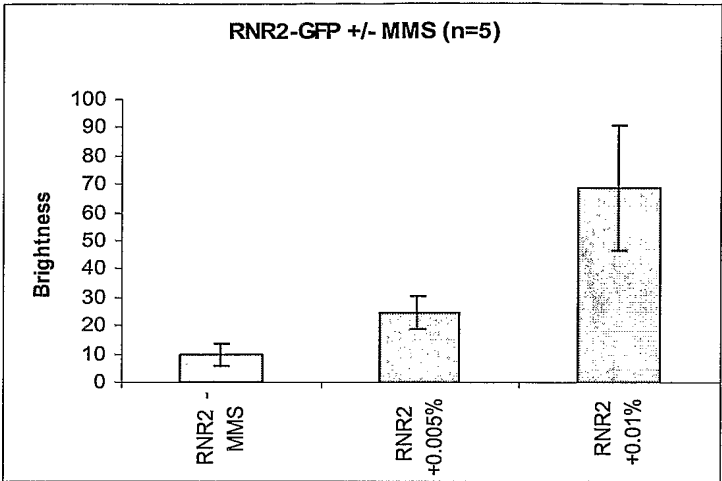
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GGGATTTCTGTTTCATGGGGGTAATGATACCGATGAAACGAGAGAGGATGCTCACGATACGGGTTACTGATGA
TGAACATGCCCCGTTACTGGAACGTTGTGAGGGTAAACAACCTGGCGGTATGGATGCGGCGGGACAGAGAAA
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GATCATGCGCACCCGTGGCCAGGACCAACGCTGCGGGGGGGGGGGGGTTTTCTTTCCAATTTTTTTTTTTT
TCGTCATTATAGAAATCATTACGACCGAGATTCCCGGGTAATAACTGATATAATTAATGAAGCTCTAATT
TGTGAGTTTAGTATACATGCATTTACTTATAATACAGTTTTTTAGTTTTGCTGGCCGCATCTTCTCAAATAT
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TCCGCCGCTGCTTCAAACCGCTAACAATACCTGGGCCACCACACCGTGTGCATTGTAATGTCTGCCCAT
TCTGCTATTCTGTATACACCCGAGAGTACTGCAATTTGACTGTATTACCAATGTGAGCAATTTTCTGTCT
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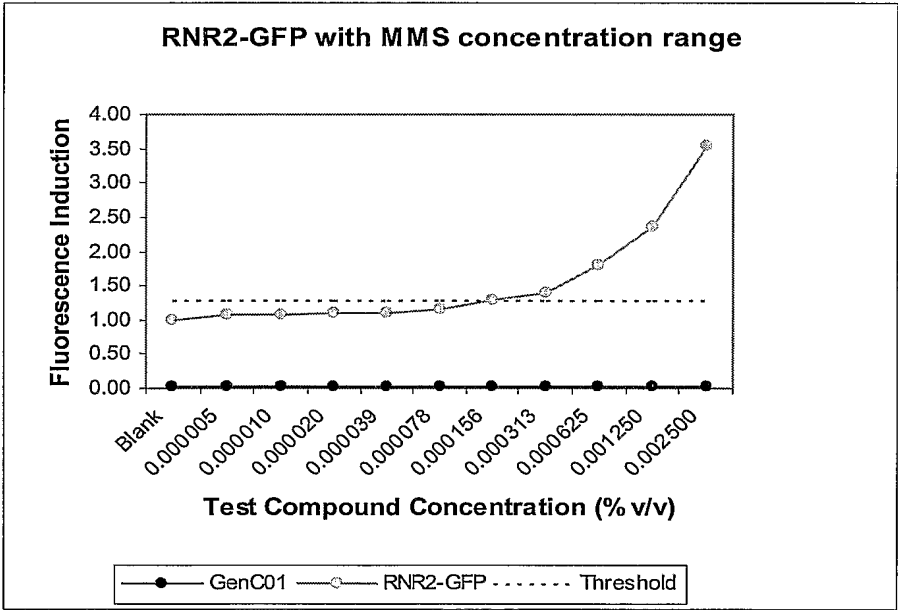
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AGTAGTAGGTTGAGGCCGTTGAGCACCGCCGCCGCAAGGAATGGTGATGCAAGGAGATGGCGCCCCAACAGT
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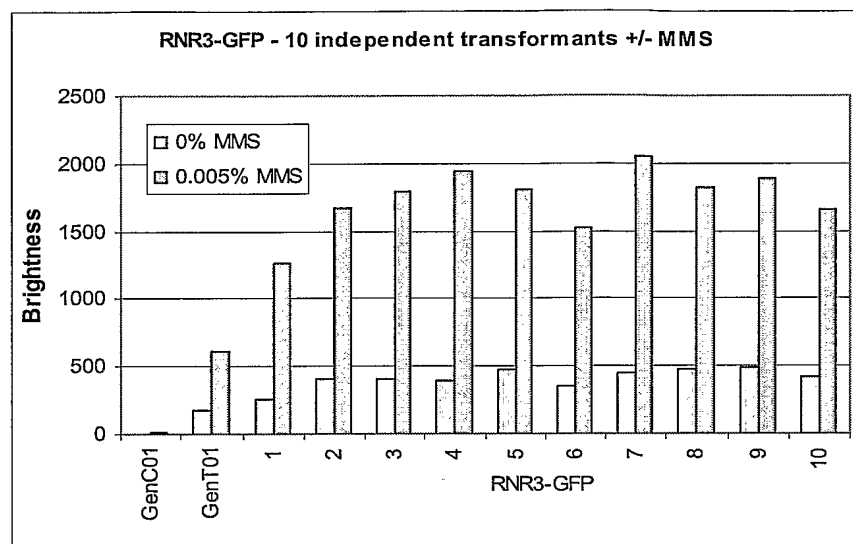
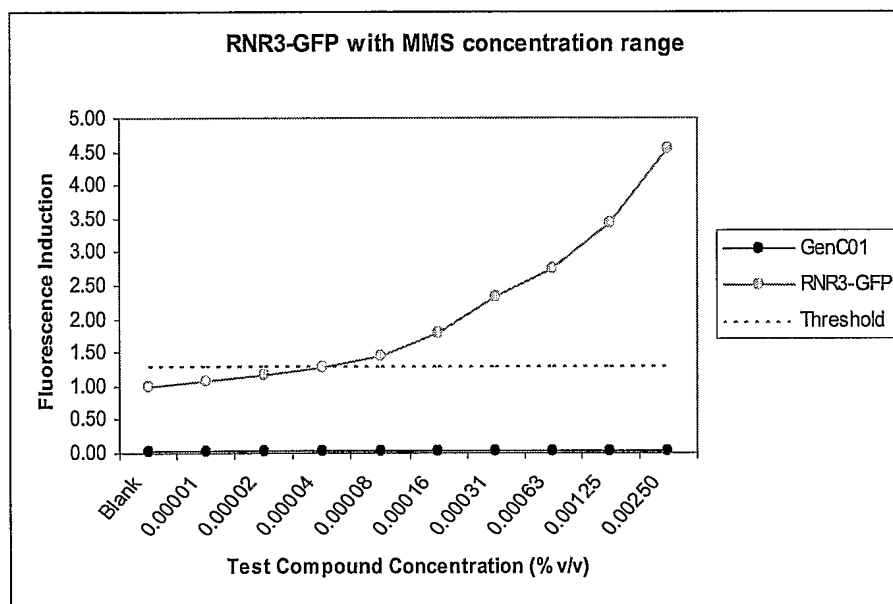
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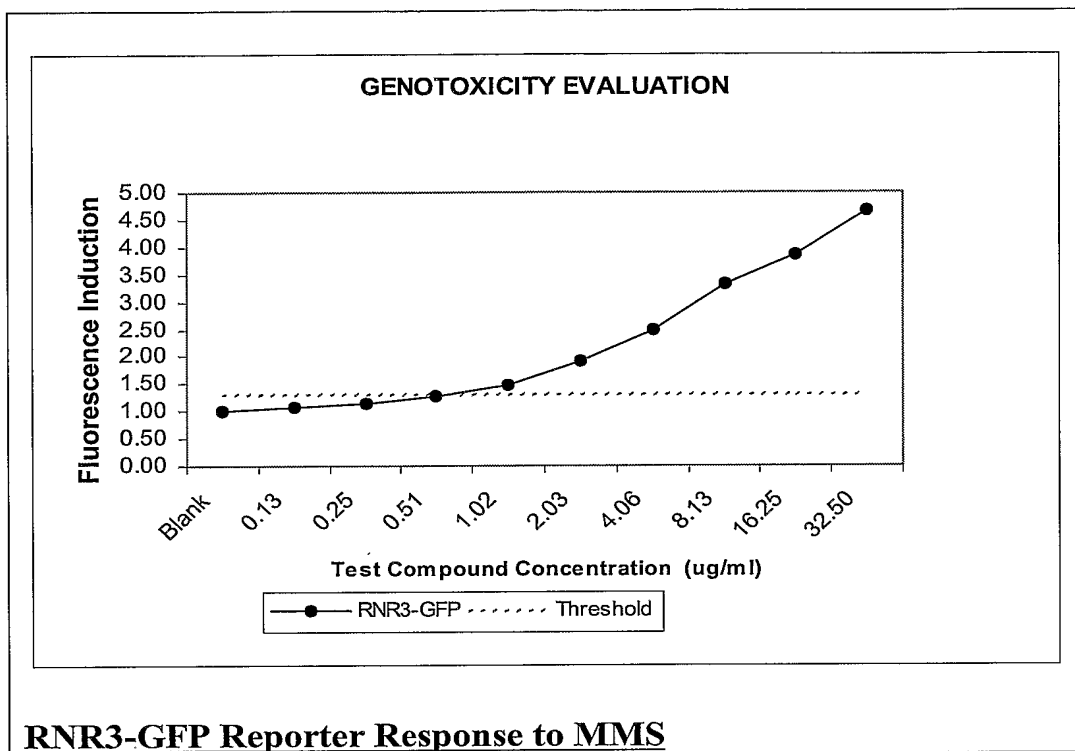
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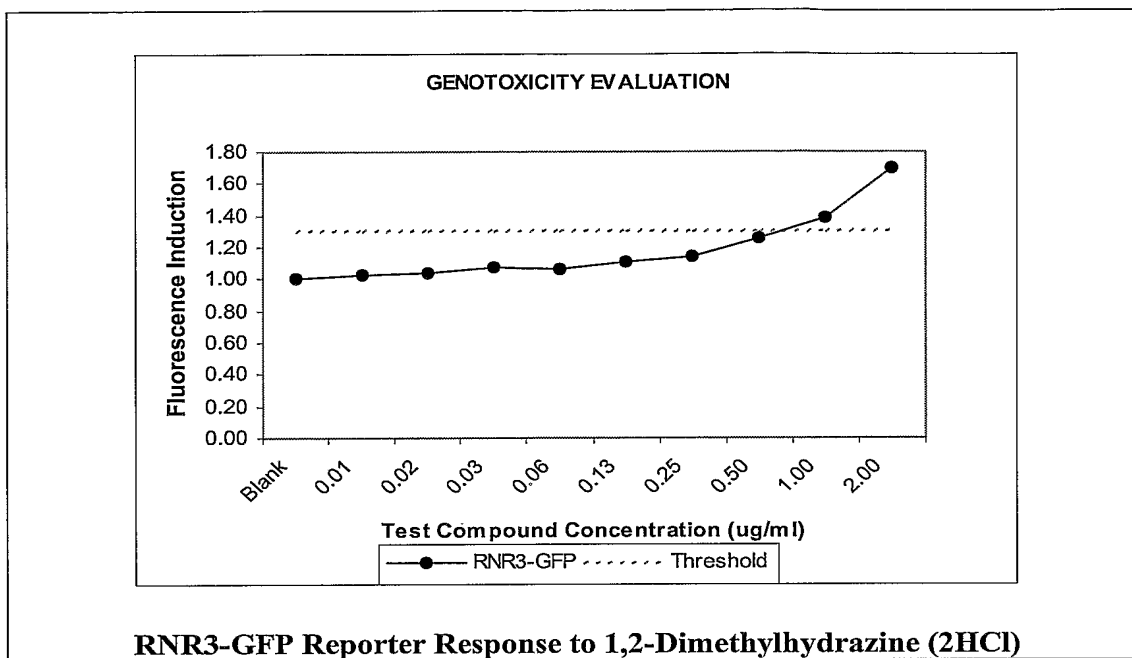
B

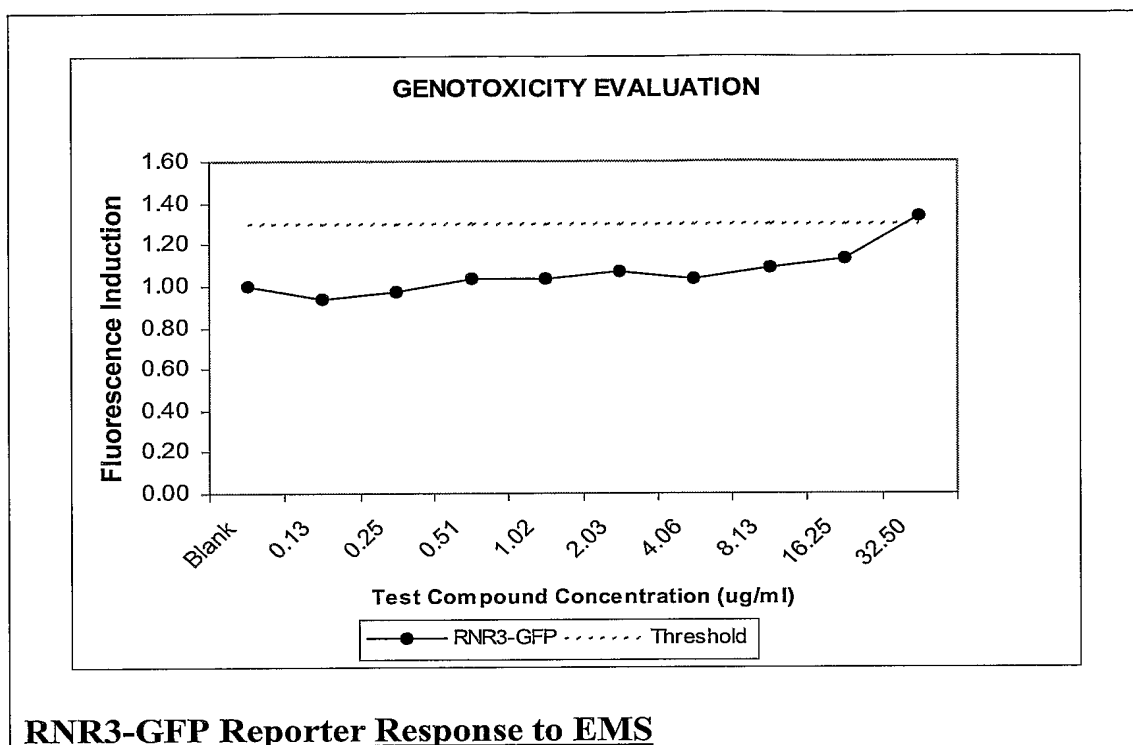


42/61**FIG. 29****A****B**

43/61**Fig:30****Methyl methanesulfonate**

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Fig:31**1,2-Dimethylhydrazine (dihydrochloride)**

45/61**Fig:32****Ethyl methanesulfonate**

46/61Fig:33**RNR3 sequence data downloaded from SGD, Chromosome IX:**

```

1  AGATTCTGCG CCAGCAAGTC GTCTCCGAGG GGGGGCCAC CGCTACCATA
51  CAGTCAAGGT TTAACACGC ATGGGGGCTG ATCAAATCCA CTGACGTGAA
101 TGACGAAAGG CTTGGTGTGA AAATCCTCAC AGACATTAC AAAGAGGCCG
151 AGTCCCGTAG ACGAGAATGC CTATATTATC TGACCATAGG TTGCTACAAA
201 CTCGGTGAAT ACTCTATGGC GAAGAGATAT GTAGACACTT TATTTGAGCA
251 TGAGCGTAAT AACAGCAGG TGGGCGCTTT GAAGAGTATG GTAGAGGATA
301 AGATCCAGAA GGAAACACTC AAGGGTGTTG TCGTCGCTGG AGGCGTACTA
351 GCCGGCGCTG TGGCCGTGGC TAGTTTCTTC TTAAGAAACA AGAGAAGGTA
401 ACAAGCACAT AAAAAATCAG CACATACGTA CACATACATG AATGAATCGC
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651 TTTTGTTTTT TTTTTTTTTT TTTTTCGTG GTTGTCGCAG CAACGACACC
701 TAGGCGCTGC TCAAAGGGGC AAAAACCCTG TTGCCATGGC GAGGACCAAA
751 CGACAAGATG GGAAAAAAC AATAGTCTAT TGTTAAATCG TAATACTGTA
801 TTGTGAGATG CTGACGCGTT TCGTTTTTCG TGTCAGCGTT CTTTATATTG
851 TTTTCGTGTT TGCTGCAAAA CGTATATAAA CGCACTGCTA TTTTGCCCTT
901 TTTTGCCTTC TTCCTTGCTT TTCTCTCATC TCATATCCAA GTTGAAATAA
951 ATATGACAAG CAAGAATAGC AGCAGCAATA AATCAAATAC TCCGACACAA
1001 ATGTACGTTA TTAAGAGAGA CGGCCGCAA GAGCCCGTTC AATTCGATAA
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1151 GTTACTACCG TTGAGCTGGA CAATCTTGCA GCTGAAACAT GTGCATACAT
1201 GACCACTGTG CACCCTGATT ATGCCACTCT AGCCGCTAGA ATCGCATCTT
1251 CTAACCTACA TAAGCAAACC ACAAAGCAAT TCTCCAAAGT TATTGAGGAT
1301 TTACACGACT GGATTAACCC AGCTACTGGA AAGCATGCTC CTATGATTTC
1351 GGACGAAATT TACAACATTG TCATGGAAAA CAAAGATACT TTGAACTCGG
1401 CCATCGTGTA CGATAGGGAT TTCCAGTATA CGTATTTTCG ATTCAAGACA
1451 CTGGAGCGTT CGTACTTGCT AAGACTGAAC GGTGAAGTGG CAGAACGTCC
1501 TCAGCATTTG GTAATGCGTG TGGCGCTAGG TATCCATGGT AGCGATATCG
1551 AATCTGTGCT GAAGACTTAT AATTTGATGT CGTTAAGATA CTTCACTCAC
1601 GCTTCCCCAA CTTTATTCAA CGCTGGTACG CCACATCCTC AAATGTCTTC
1651 ATGTTTCTTA ATTGCCATGA AGGATGACTC TATCGAAGGT ATTTATGATA
1701 CTTTGAAAGA ATGTGCTATG ATTTCCAAAA CTGCAGGTGG TGTTGGTCTT
1751 CATATCAACA ACATCCGTTT CACAGGTTCT TATATCGCTG GTACCAACGG
1801 TACTTCAAAC GGGTTGATTC CTATGATTCT TGTTTTCAAT AATACTGCCC
1851 GTTATGTGGA CCAGGGTGGT AACAAGAGAC CTGGTGCTTT CGCCCTTTTC
1901 TTGGAGCCAT GGCATGCAGA TATCTTCGAC TTTGTCGATA TCAGAAAAAC
1951 ACATGGTAAG GAAGAAATTC GTGCAAGAGA TTTGTTCCCT GCTCTATGGA
2001 TCCCTGATCT TTTTATGAAA CGTGTTCAAG AGGATGGGCC TTGGACTTTG
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2151 AAGCCCCAAA GTTGTGGTAT GCCATTTTGC AAGCACAGAC AGAAACAGGT
2201 ACACCTTTCA TGGTTTATAA GGACGCATGT AACAGGAAGA CAAACCAACA
2251 GAACTTAGGT ACTATCAAAT CATCTAATTT ATGTTGTGAA ATCGTCGAAT
2301 ATTCCTCCCC GGATGAAACT GCAGTTTGTA ATTTAGCTTC TATTGCCCTA
2351 CCAGCATTCG TTGAGGTTTC AGAAGATGGT AAAACTGCAA GCTATAATTT
2401 CGAGAGATTA CACGAGATTG CTAAAGTCAT TACTCACAAAC TTGAACAGAG
2451 TTATCGACCG TAATTACTAT CCAGTTCCCG AGGCTAGAAA TTCAAATATG
2501 AAGCATAGAC CTATTGCTCT TGGTGTCCAG GGTTTGGCCG ATACTTATAT
2551 GATGTTGCGT CTACCCTTTG AATCGGAAGA AGCTCAAACCT CTAAACAAAC
2601 AAATCTTCGA AACTATTTAC CATGCTACTC TTGAAGCCTC CTGTGAATTG
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2751 ATTGGGAAAC CTTAAGAAAG GACATTGTTA AACATGGGTT AAGAAACTCT
2801 TTGACTATGG CACCAATGCC AACC GCCTCA ACTTCCCAA TTCCTGGTTA
2851 TAATGAATGC TTCGAACCAG TGACCTCAA CATGTACTCT CGTCGTGTCC
2901 TGTCTGGTGA ATTCCAAGTT GTTAATCCAT ATTTACTACG TGATTTAGTC
2951 GACCTGGGTA TTTGGGATGA TAGTATGAAA CAATATCTAA TTACACAAAA
3001 TGGTTCTATT CAAGGCTTAC CAAATGTGCC ACAAGAATTG AAGGAATTAT
3051 ACAAACCGT CTGGGAAATC TCTCAAAGA CCATTATCAA TATGGCTGCT
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3151 AGCACCATCA ATGGGTAAGA TTACTAGTAT GCATTTCTAC GGTGGAAGA
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3251 GCTATTCAAT TTACCATTGA TCAAGAGGTT GCCGATCAAG CCGCTACACA
3301 TATTGCTTCC GTCTCAGAA TGGATCGTCC AGTTTATGTT CCAAAGGGTA
3351 CAAAATTCTC TGAACAAAAG GCGGCATCTG CGCTTACCGA AAGCTCAGAT
3401 AATGAGAAGG ATGCATCTCC AGTTCCATCC GAACAATCAT CGGTGTGCGAG
3451 TGCCATGTCA AATGTGAAAT TGGAAGATAG TGTTGCCCCA GCAGTTCCAA
3501 CGGAAACAAT AAAAGAAGAT TCCGACGAGA AGAAATGTGA CATTTACAAT
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Removal of Bacterial Origin of replication and Amp Resistance

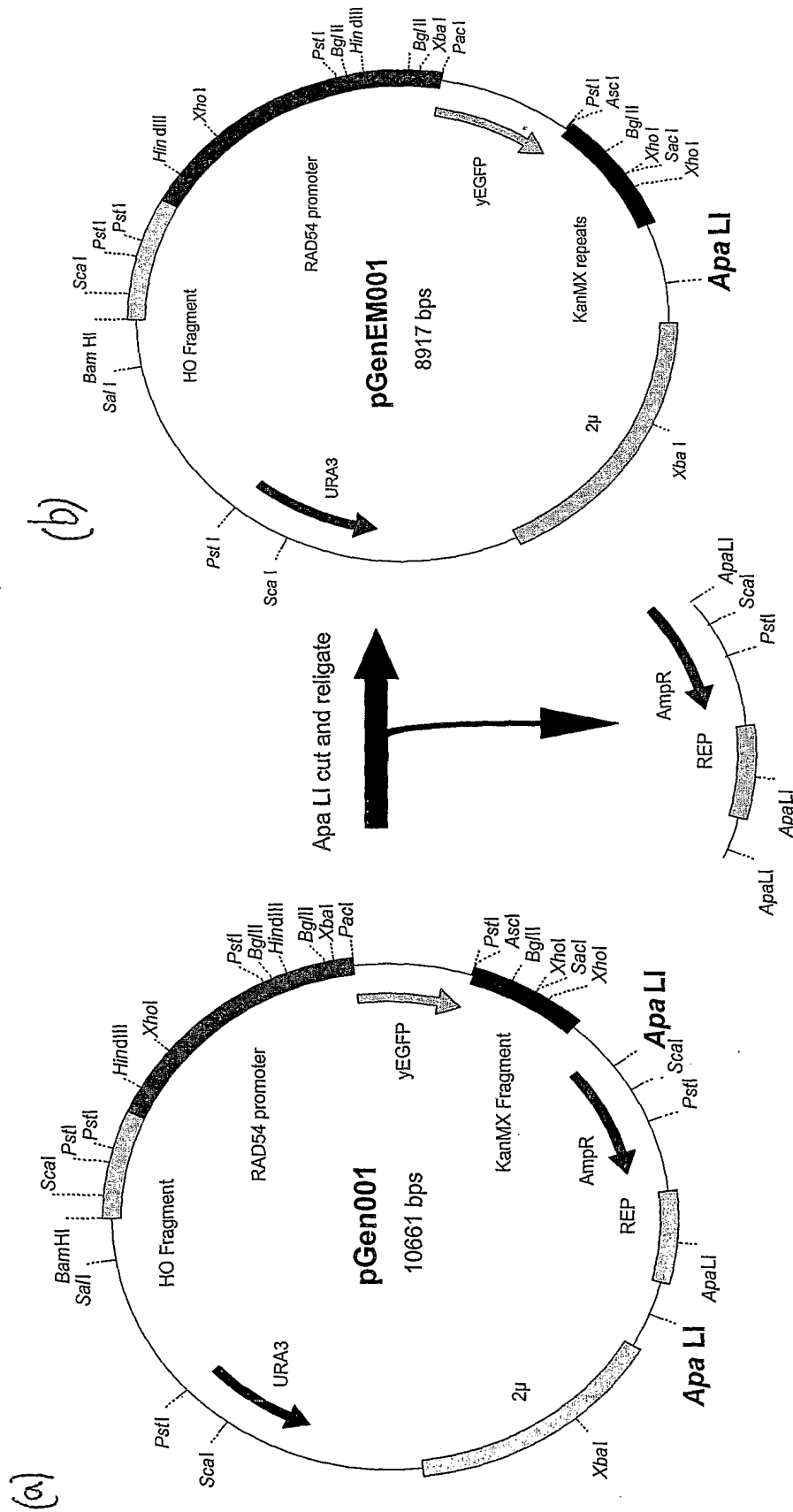


FIG:34

49/61**Fig:35****Fragment of HO sequence used in the integrating vector (pWDH443)**

```

1  AAATTGTGAC AGCTTTCAG AATGGATTAT TTTTCCTCAA ATTCCTTGTC
51  TTCCTGTTTT CATCTGGACC ATCTCCATAA TGAAGCCTTA CATGTTTGGC
101 ACGTAGCGGA ACGTGATCGT CACAAACCGT AAGGTAGAGA CCCCAGATTT
151 TCGCATTTTC TCTTAAACTC TCCATTAGCT TAGGATCCAA GCTATCTACT
201 GAGATTTCTG GCTCTTTTGT TGTACTGTCA CCTAACCACA GACCAAGCAT
251 CCAAGCCATA CTTTTTACAG CAGGAGTTAC AAGGTCAC TA CGTCCAGTGA
301 GAAATTTAGA TAAACACCA TTTCTGCGA GTACTGGACC AAATCTTATG
351 CAGCTAGAAA TTCTCAATTG AGCATCAAGA TAATCCAAAT CTCTAACTTC
401 AATGTCAAAG TTGAAATATT CTCCTTTAGA GCGCTCCATT TCTTCTATGA
451 AGCGTTTTTG GCCAAACCTCA CCTTCAACTG TCATTGGGAA TGTCTTATGA
501 TGGTTTTTTG GAATTATTAT TATCCTACCA TCAAGCGTCT GACATTGCTG
551 CAGATTTCTC CATCTCACTT TATATTTGGT GGCATTTCTA CCACTTTTTT
601 CCAACAGTGG TTTGGTAGGG ACCCTGACTG ACAATTTATG ACCTGCAGTA
651 CATTGTAATG CAAGACGCTG ATAAACTGTT CTACGCCTGG GATCTAACCT
701 ACCAGGTTCA CCTTCAAAG CTCTGTGTTT GGTTTTTTGC TGTATATTAT
751 AGATTTTCTG ATAGCCCTGT GTGACATTTA TGACGCGGGC AGCGGAGCCA
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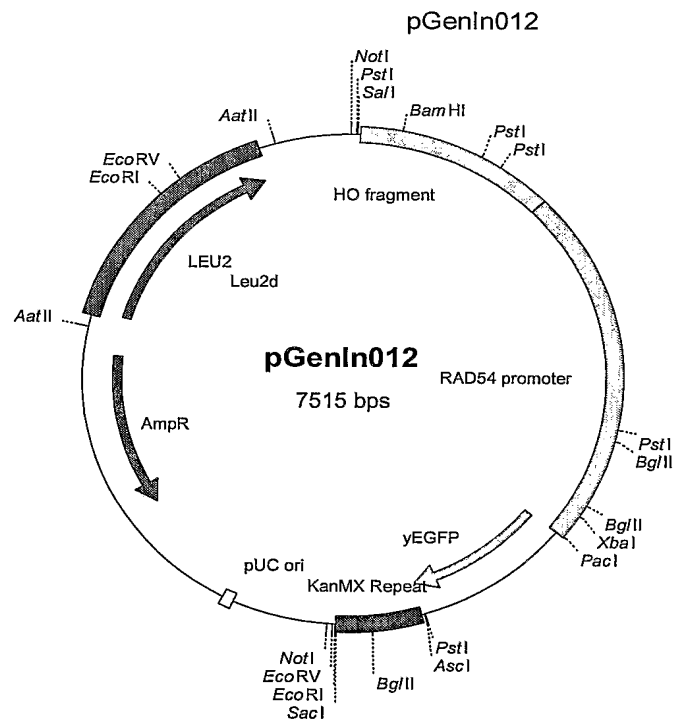
Fig:36

Fig:37**rDNA sequence used in multiple copy rDNA integrating plasmids**

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101 TCGAACTTGT CTTCAACTGC TTTCGCATGA AGTACCTCCC AACTACTTTT
151 CCTCACACTT GTACTCCATG ACTAAACCCC CCCTCCCATT ACAAATAAAA
201 ATCTTACTTT TATTTTCTTT TGCCCTCTCT GTCGCTCTGC CTTAACCTACG
251 TATTTCTCGC CGAGAAAAAC TTCAATTTAA GCTATTCTCC AAAAATCTTA
301 GCGTATATTT TTTTTCCTAA GTGACAGGTG CCCCAGGTAA CCCAGTTCCT
351 CACTATTTTT TACTGCGGAA GCGGAAGCGG AAAATACGGA AACGCGCGGG
401 AACATACAAA ACATACAAA TATACCTTTC TCACACAAGA AATATATGCT
451 ACTTGCAAAA TATCATACCA AAAAATTTTT CACAACCGAA ACCAAAACCA
501 ACGGATATCA TACATTACAC TACCACCATT CAAACTTTAC TACTATCCTC
551 CCTTCAGTTT CCCTTTTTCT GCCTTTTTTC GTGACGGAAA TACGCTTCAG
601 AGACCCTAAA GGGAAATCCA TGCCATAACA GGAAAGTAAC ATCCCAATGC
651 GGACTATACC ACCCCACCAC ACTCCTACCA ATAACGGTAA CTATTCTATG
701 TTTTCTTACT CCTATGTCTA TTCATCTTTC ATCTGACTAC CTAATACTAT
751 GCAAAATGT AAAATCATCA CACAAAACAT AAACAATCAA AATCAGCCAT
801 TTCCGCACCT TTTCTCTGT CCACCTTCAA CCGTCCCTCC AAATGTAAAA
851 TGGCCTATCG GAATACATTT TCTACATCCT AACTACTATA AAACAACCTT
901 TAGACTTACG TTTGCTACTC TCATGGTCTC AATACTGCCG CCGACATTCT
951 GTCCACATA CTAAATCTCT TCCCCTCATT ATCGCCCGCA TCCGGTGCCG
1001 TAAATGCAAA ACAAATACCA TCTATGTCTT CCACACCATC ATTTTACTAT
1051 GCCTGCCACC ATCCATTTGT CTTTTGCACC ATATCTTCAT AACCTGTCAC
1101 CTTGAACTA CCTCTGCATG CCACCTACCG ACCAACTTTC ATGTTCTGTT
1151 TCGACCTACC TCTTGTAAT GACAAATCAC CTTTTTCATC GTATGCACCT
1201 TATTCTCCAC ATCACAATGC ACTATTGCTT TTGCTTTTTT ACCTGTCATA
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1901 TCGCCGCGTC GCCAAAAATT TACTTCGCCA ACCATTCCAT ATCTGTTAAG
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2001 TTCTTCCCAG TAGCCTCATC CTTTACGCT GCCTCTCTGG AACTTGCCAT
2051 CATCATTCCT TAGAACTGCT CATTTACTTA AAAAAAAAAA AAAAAAAAAA
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2201 GTTAACTATA GGAAATGAGC TTTTCTCAAT TCTCTAACT TATACAAGCA
2251 CCTCATGTTT GCCGCTCTGA TGGTGCGGAA AAAACTGCTC CATGAAGCAA
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2501 GTTTTTTACCC GGATCATAGA ATTCTTAAGA CAAATAAAAT TTATAGAGAC
2551 TTGTTTCAGTC TACTTCTCTC TAAACTAGGC CCCGGCTCCT GCCAGTACCC
2601 ACTTAGAAAG AAATAAAAAA CAAATCAGAC AACAAAGGCT TAATCTCAGC
2651 AGATCGTAAC AACAAAGGCTA CTCTACTGCT TACAATACCC CGTTGTACAT
2701 CTAAGTCGTA TACAAATGAT TTATCCCCAC GCAAATGAC ATTGCAATTC
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2951 CAGCCGCAAA AACCAATTAT CCGAATGAAC TGTTCTCTC GTACTAAGTT
3001 CAATTACTAT TGCGGTAACA TTCATCAGTA GGGTAAACT AACCTGTCTC
3051 ACGACGGTCT AAACCCAGCT CACGTTCCCT ATTAGTGGGT GAACAATCCA
3101 ACGCTTACCG AATTCTGCTT CGGTATGATA GGAAGAGCCG ACATCGAAGA
3151 ATCAAAAAGC AATGTCGCTA TGAACGCTTG ACTGCCACAA GCCAGTTATC
3201 CCTGTGGTAA CTTTTCTGGC ACCTCTAGCC TCAAATTCGG AGGGACTAAA
3251 GGATCGATAG GCCACACTTT CATGGTTTGT ATTCACACTG AAAATCAAAA
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3451 ACCTTGAATG CTAGAACGTG GAAAATGAAT TCCAGCTCCG CTTCAATTGAA
3501 TAAGTAAAGA AACTATAAAG GTAGTGGTAT TTTACTGGCG CCGAAGCTCC
3551 CACTTATTCT ACACCTCTA TGTCTCTTCA CAATGTCAAA CTAGAGTCAA
3601 GCTCAACAGG GTCTTCTTTC CCCGCTGATT CTGCCAAGCC CGTTCCTTGT
3651 GCTGTGGTTT CGCTAGATAG TAGATAGGGA CAGTGGGAAT CTCGTTAATC
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3751 GAGTCATAGT TACTCCCGCC GTTTACCCGC GCTTGGTTGA ATTTCTTCAC
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3851 CTGACCATCG CAATGCTATG TTTTAATTAG ACAGTCAGAT TCCCCTTGTC
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3951 AGACCTACCA AGGCCGTCTA CAACAAGGCA CGCAAGTAGT CCGCCTAGCA
4001 GAGCAAGCCC CACCAAGCAG TCCACAAGCA CGCCCGCTGC GTCTGACCAA
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4201 ATTCCTTCCT GTGGATTTTC ACGGGCCGTC ACAAGCGCAC CGGAGCCAGC
4251 AAAGGTGCTG GCCTCTTCCA GCCATAAGAC CCCATCTCCG GATAAACCAA
4301 TTCCGGGGTG ATAAGCTGTT AAGAAGAAAA GATAACTCCT CCCAGGGCTC
4351 GCGCCGACGT CTCCACATTC AGTTACGTTA CCGTGAAGAA TCCATATCCA
4401 GGTTCCGGAA TCTTAACCGG ATTCCTTTTC GATGGTGGCC TGCATAAAAT
4451 CAGGCCTTTG AAACGGAGCT TCCCCATCTC TTAGGATCGA CTAACCCACG
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Fig:38

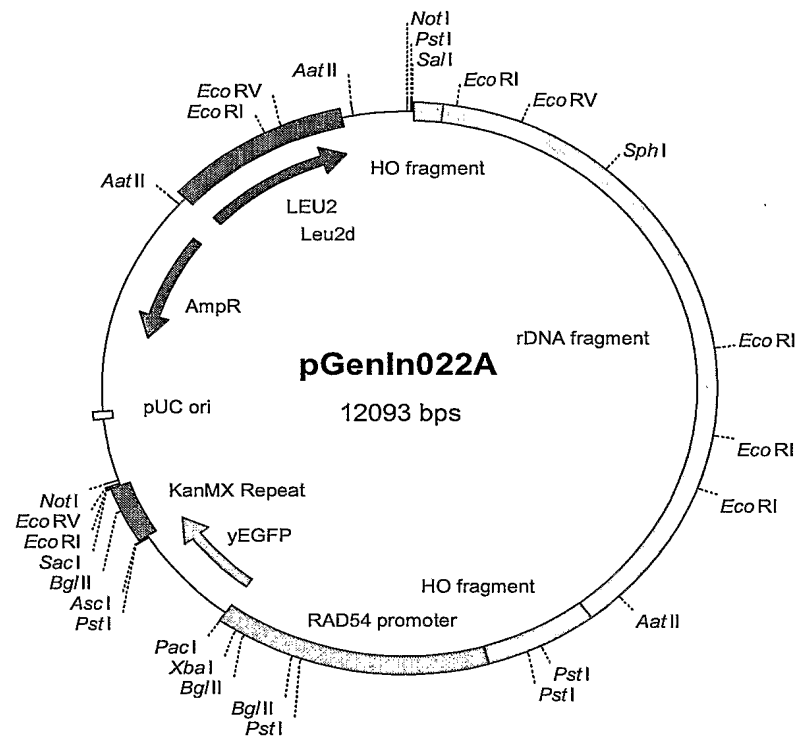
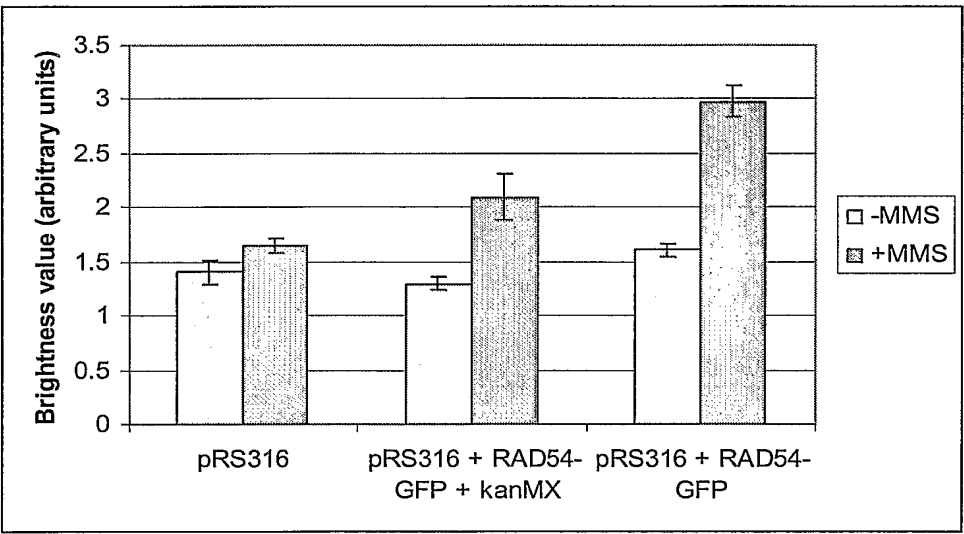
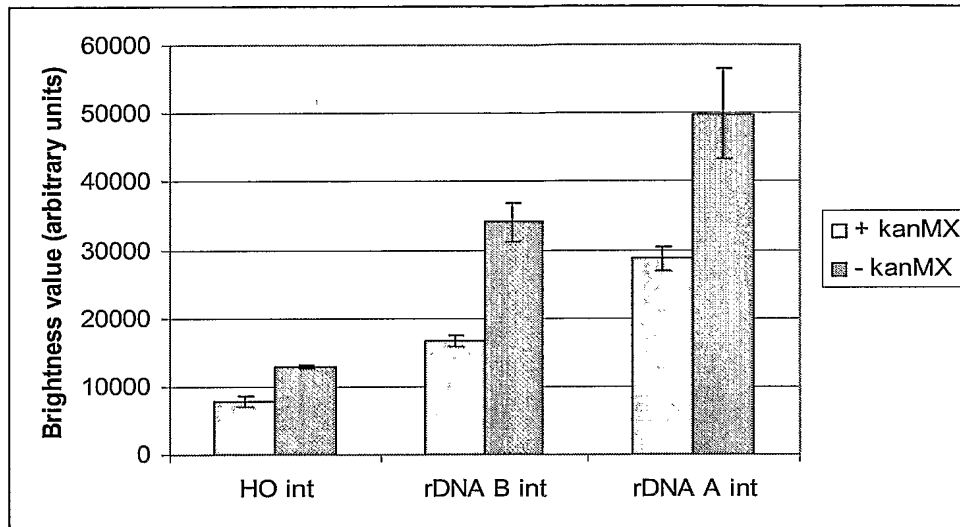


Fig:39



53/61**Fig:40**

54/61**Fig:41** pGenIn012 - 7515 bp

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101 CCTGTTTTCA TCTGGACCAT CTCCATAATG AAGCCTTACA TGTTTGGCAC
151 GTAGCGGAAC GTGATCGTCA CAAACCGTAA GGTAGAGACC CCAGATTTTC
201 GCATTTTCTC TTAAACTCTC CATTAGCTTA GGATCCAAGC TATCTACTGA
251 GATTTCTGGC TCTTTTGTTG TACTGTCACC TAACCACAGA CCAAGCATCC
301 AAGCCATACT TTTTACAGCA GGAGTTACAA GGTCACTACG TCCAGTGAGA
351 AATTTAGATA AAACACCATT TCCTGCGAGT ACTGGACCAA ATCTTATGCA
401 GCTAGAAATT CTCAATTGAG CATCAAGATA ATCCAAATCT CTAACTTCAA
451 TGTCAAAGTT GAAATATTCT CCTTTAGAGC GCTCCATTTT TTCTATGAAG
501 CGTTTTGCGG CAAACTCACC TTCAACTGTC ATTGGAATG TCTTATGATG
551 GTTTTTTGGA ATTATTATTA TCCTACCATC AAGCGTCTGA CATTGCTGCA
601 GATTTCTCCA TCTCACTTTA TATTTGGTGG CATTTCTACC ACTTTTTTCC
651 AACAGTGGTT TGGTAGGGAC CCTGACTGAC AATTTATGAC CTGCAGTACA
701 TTGTAATGCA AGACGCTGAT AAACGTGTTT ACGCCTGGGA TCTAACCTAC
751 CAGGTTCAAC TTCAAAAGCT CTGTGTTTGG TTTTTTGCTG TATATTATAG
801 ATTTTCTGAT AGCCCTGTGT GACATTTATG ACGCGGGCAG CGGAGCCATC
851 TGCGCACATA ACGTAAGAGT TAGCCGTGAC GTTTGCGATG TCTTTAATTT
901 CACCGTTAGC CATCAGAATA GTCGTGTTTT CAGAAAGCAT TTTGATCCGA
951 CATACGATGA CCTCAATGAT TTAGATTATG TGTTGCACTT TTATAGACCT
1001 ACCAAAAATC CAGTGCGTAC ACTAATACTT TCATAAAGAT ACCTGAAACA
1051 ATAACAGAA AGATCGGCAA AAAAAATTTT TTTCTTTGCC GAGATCACAA
1101 ACCTACTATG ACGAAAAAGC TTGAAGTTTA GATGAGTAAG GAAAATACAA
1151 GTGACGCTTT TATATGGTGC AAGGAACAAA AACTAAAAAC AACAAGGCAA
1201 ATGTGGATCT GTCATGTATG GCAACGACAG CAGGATGGCT CACAAAAAAA
1251 GACAAAAAAA ACTAAGGCAA AAGAACAAAG CTCCTCTCCT GCTCAAGAAA
1301 CGTATTGTTG AAAAACCACC GTCGTAAGAA AGTTTTTCTG TGACCTATAA
1351 TGGTTTAAAA TCGGCCCAT TTTTTTCCCT CTTTTGTGGT CCAGTCTTTC
1401 TCATACTCGA GGGAAATTCG ACACAAACAG CGGAGAAGTG TGGCTAAACC
1451 GGCAAGTGCC TGCAAGATCC ACAGAATAA CCGCACGAAC TGGCGGTCAA
1501 AAAAGAGCCT GTTCCGGAAG GAGAGAAACA GAGAAACGAT CATGATGGGA
1551 AAGCGGGGAT TCGGCGAAGA ACGAGACTGG AAAGGGAAAA AGAGAAATAC
1601 TGGTGGAAGT ATTCCGACCT TTGGCGAAGT CCGAACCTTT GAAACCCAAA
1651 GATGATCGAT GATTCATTTT TCAATGCGCT ACGGTTCTCT CCGCTCGTGG
1701 GAACCCACG CAAAACATAT TATTCGCTTC TCTCTGCTGA CAACTCCGGT
1751 TTACGTTATA CCGTATTAGG ATCACTATAA GGGTTCCTTC GGGAGGAGGG
1801 GGGAGGGGAA GAATGTACAT CGTCATAAGG CCTTTATGGT GTGAAGTGGG
1851 TTTTGCGTGG AAAATTCTGT TTCAATGATA TAGAGCCAC GCATATACGT
1901 ACATACTAGT GGCCAAAAGC GTGGGGTGGG CGGACAAAGC TACACTGGTA
1951 AAATACAGGA TTCTATGAAC AATAACAACA ACCAGCTCAC GTTGCTGAAC
2001 AGCCGAGGTC AGCCGATGCA ACCGAGGTTT CCAAAGTAGC ATTTCTGTGC
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2101 TGCTTGCAAT TGATGTCCTG CAGATGGTAA GAAGATTCTG AAAGCCGCGC
2151 TAGGAGAAAA ATATTCTGCT CGAAGATCTG TCCTCTTAAG TAGAAAGCGT
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2251 ACTGCACCTG CATGATAAAG CTTATGTATC AAAAATTTAA CATCTTGAAA
2301 ATACACAAGT GGTGCAAAGA TGTGTCACGT TCTGGACCTG AGTGGTGCCA
2351 TGTATGCTAT TTAACATGCA AAGGGGAAGA CCCTTCGCGC TTAATGCAAT
2401 AATAAAAAAGT ATTTTACGCG TTACCCAATA TAGCAAAGTT TCGCGCAAAA
2451 AAAAAAATAA AAAACAATTA CAAACAAAAA GAAAAAAAG GAAATAATAG
2501 AAGATCTAAC TGAAGCGAAG GCCAAAACCT TTCTCACTTG ACGTAATAGC

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2551 CGATACAAAA TCTAGAGCAG CAACTTTTCT CTTTCTTCAC TAAAGCTGCT
2601 ACGAAAGTAT AGAAAAATCA AACGCTCAGA ACTTAGCTCT ATTTCAAGGT
2651 ACCATATATA TTTCTTTATA ACTGATGTTA ATTAACCTCT AAGGTGAAGA
2701 ATTATTCACT GGTGTTGTCC CAATTTTGGT TGAATTAGAT GGTGATGTTA
2751 ATGGTCACAA ATTTTCTGTC TCCGGTGAAG GTGAAGGTGA TGCTACTTAC
2801 GGTAAATTGA CCTTAAATTT TATTTGTACT ACTGGTAAAT TGCCAGTTCC
2851 ATGGCCAACC TTAGTCACTA CTTTCGGTTA TGGTGTTCAA TGTGTTGCGA
2901 GATACCCAGA TCATATGAAA CAACATGACT TTTTCAAGTC TGCCATGCCA
2951 GAAGGTTATG TTCAAGAAAG AACTATTTTT TTCAAAGATG ACGGTAACCTA
3001 CAAGACCAGA GCTGAAGTCA AGTTTGAAGG TGATACCTTA GTTAATAGAA
3051 TCGAATTAAA AGGTATTGAT TTTAAAGAAG ATGGTAACAT TTTAGGTCAC
3101 AAATTGGAAT ACAACTATAA CTCTCACAAT GTTTACATCA TGGCTGACAA
3151 ACAAAGAAT GGTATCAAAG TTAACCTCAA AATTAGACAC AACATTGAAG
3201 ATGGTCTCTG TCAATTAGCT GACCATTATC AACAAAATAC TCCAATTGGT
3251 GATGGTCCAG TCTTGTTACC AGACAACCAT TACTTATCCA CTCAATCTGC
3301 CTTATCCAAA GATCCAAACG AAAAGAGAGA CCACATGGTC TTGTTAGAAT
3351 TTGTTACTGC TGCTGGTATT ACCCATGGTA TGGATGAATT GTACAAATAA
3401 CTGCAGGGCG CGCCACTTCT AAATAAGCGA ATTTCTTATG ATTTTATGATT
3451 TTTATTATTA AATAAGTTAT AAAAAAATA AGTGTATACA AATTTTAAAG
3501 TGACTCTTAG GTTTTAAAC GAAAATCTT ATTCTTGAGT AACTCTTTCC
3551 TGTAGGTCAG GTTGCTTTCT CAGGTATAGT ATGAGGTCGC TCTTATTGAC
3601 CACACCTCTA CCGGCAGATC CGCTAGGGAT AACAGGGTAA TATAGATCTG
3651 CCCGCCGGGA AGGCGAACCC GATCGGATGC ATCCTCTCTG CTGCCATGAT
3701 GCTGAAGTTG TCGTTGAACA TGGTTGCTGC CGGCGAGGCG GTCGAGCAGG
3751 CAGTGCAGGA GGTGTTGGAC TCGGGAGTCA GAACGGGCGA CCTGCTCGGC
3801 TCGAGCTCGA ATTCATCGAT GATATCAGAT CCACCTAGTG CTTATGCGGC
3851 CGCGGATCTG CCGGTCCTCC TATAGTGAGT CGTATTAATT TCGATAAGCC
3901 AGGTTAACCT GCATTAATGA ATCGGCCAAC GCGCGGGGAG AGGCGGTTTG
3951 CGTATTGGGC GCTCTTCCGC TTCTTCGCTC ACTGACTCGC TGCGCTCGGT
4001 CGTTCGGCTG CCGCGAGCGG TATCAGCTCA CTCAAAGGCG GTAATACGGT
4051 TATCCACAGA ATCAGGGGAT AACGCAGGAA AGAACATGTG AGCAAAAGGC
4101 CAGCAAAAGG CCAGGAACCG TAAAAAGGCC GCGTTGCTGG CGTTTTTCCA
4151 TAGGTTCCGC CCCCCTGACG AGCATCACAA AAATCGACGC TCAAGTCAGA
4201 GGTGGCGAAA CCCGACAGGA CTATAAAGAT ACCAGGCGTT TCCCCTGGA
4251 AGCTCCCTCG TCGCTCTCC TGTTCGACC CTGCCGCTTA CCGGATACCT
4301 GTCCGCCTTT CTCCCTTCGG GAAGCGTGGC GCTTTCTCAA TGCTCACGCT
4351 GTAGGTATCT CAGTTCGGTG TAGGTCGTTT GCTCCAAGCT GGGCTGTGTG
4401 CACGAACCCC CCGTTCAGCC CGACCGCTGC GCCTTATCCG GTAACATATC
4451 TCTTGAGTCC AACC CGGTAA GACACGACTT ATCGCCACTG GCAGCAGCCA
4501 CTGGTAACAG GATTAGCAGA GCGAGGTATG TAGGCGGTGC TACAGAGTTC
4551 TTGAAGTGGT GGCCTAACTA CGGCTACACT AGAAGGACAG TATTTGGTAT
4601 CTGCGCTCTG CTGAAGCCAG TTACCTTCGG AAAAAAGAGT GGTAGCTCTT
4651 GATCCGGCAA ACAAACCACC GCTGGTAGCG GTGGTTTTTT TGTTTGCAAG
4701 CAGCAGATTA CGCGCAGAAA AAAAGGATCT CAAGAAGATC CTTTGATCTT
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4951 TTCGTTTCATC CATAGTTGCC TGACTCCCCG TCGTGTAGAT AACTACGATA
5001 CGGGAGGGCT TACCATCTGG CCCCAGTGCT GCAATGATAC CGCGAGACCC
5051 ACGCTCACCG GCTCCAGATT TATCAGCAAT AAACCAGCCA GCCGGAAGGG
5101 CCGAGCGCAG AAGTGGTCCT GCAACTTTAT CCGCCTCCAT CCAGTCTATT
5151 AATTGTTGCC GGAAGCTAG AGTAAGTAGT TCGCCAGTTA ATAGTTTGCG

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5201 CAACGTTGTT GCCATTGCTA CAGGCATCGT GGTGTCACGC TCGTCGTTTG
5251 GTATGGCTTC ATTCAGCTCC GGTTCCTAAC GATCAAGGCG AGTTACATGA
5301 TCCCCCATGT TGTGCAAAAA AGCGGTTAGC TCCTTCGGTC CTCCGATCGT
5351 TGTCAAGAGT AAGTTGGCCG CAGTGTTATC ACTCATGGTT ATGGCAGCAC
5401 TGCATAATTC TCTTACTGTC ATGCCATCCG TAAGATGCTT TTCTGTGACT
5451 GGTGAGTACT CAACCAAGTC ATTCTGAGAA TAGTGTATGC GGCGACCGAG
5501 TTGCTCTTGC CCGGCGTCAA TACGGGATAA TACCGCGCCA CATAGCAGAA
5551 CTTTAAAAGT GCTCATCATT GGAAAACGTT CTTCTGGGGCG AAAACTCTCA
5601 AGGATCTTAC CGCTGTTGAG ATCCAGTTTCG ATGTAACCCA CTCGTGCACC
5651 CAACTGATCT TCAGCATCTT TTACTTTTAC CAGCGTTTCT GGGTGAGCAA
5701 AAACAGGAAG GCAAAATGCC GCAAAAAAGG GAATAAGGGC GACACGAAAA
5751 TGTTGAATAC TCATACTCTT CCTTTTTTCAA TATTATTGAA GCATTTATCA
5801 GGGTTATTGT CTCATGAGCG GATACATATT TGAATGTATT TAGAAAAATA
5851 AACAAATAGG GGTTCCGCGC ACATTTCCCC GAAAAGTGCC ACCTGACGTC
5901 GAATATCATT GAGAAGCTGC ATTTTTTTTTT TTTTTTTTTTT TTTTTTTTTTT
5951 TATATATATT TCAAGGATAT ACCATTGTAA TGTCTGCCCC TAAGAAGATC
6001 GTCGTTTTGC CAGGTGACCA CGTTGGTCAA GAAATCACAG CCGAAGCCAT
6051 TAAGGTTCTT AAAGCTATTT CTGATGTTTCG TTCCAATGTC AAGTTCGATT
6101 TCGAAAATCA TTAAATTGGT GGTGCTGCTA TCGATGCTAC AGGTGTTCCA
6151 CTTCCAGATG AGGCGCTGGA AGCCTCCAAG AAGGCTGATG CCGTTTTGTT
6201 AGGTGCTGTG GGTGGTCCTA AATGGGGTAC CGGTAGTGTT AGACCTGAAC
6251 AAGGTTTACT AAAAATCCGT AAAGAACTTC AATTGTACGC CAACTTAAGA
6301 CCATGTAAC TTTGCATCCGA CTCTCTTTTA GACTTATCTC CAATCAAGCC
6351 ACAATTGCT AAAGGTACTG ACTTCGTTGT TGTGAGAGAA TTAGTGGGAG
6401 GTATTTACTT TGGTAAGAGA AAGGAAGACG ATGGTGATGG TGTGCTTGG
6451 GATAGTGAAC AATACACCGT TCCAGAAGTG CAAAGAATCA CAAGAATGGC
6501 CGCTTTTCATG GCCCTACAAC ATGAGCCACC ATTGCTTATT TGGTCTTGG
6551 ATAAAGCTAA TGTTTTGGCC TCTTCAAGAT TATGGAGAAA AACTGTGGAG
6601 GAAACCATCA AGAACGAATT CCCTACATTG AAGGTTCAAC ATCAATTGAT
6651 TGATTCTGCC GCCATGATCC TAGTTAAGAA CCCAACCCAC CTAAATGGTA
6701 TTATAATCAC CAGCAACATG TTTGGTGATA TCATCTCCGA TGAAGCCTCC
6751 GTTATCCCAG GTTCCTTGGG TTTGTTGCCA TCTGCGTCCT TGGCCTCTTT
6801 GCCAGACAAG AACACCGCAT TTGGTTTGTA CGAACCATGC CACGGTTCTG
6851 CTCCAGATTT GCCAAAGAAT AAGGTCAACC CTATCGCCAC TATCTTGTCT
6901 GCTGCAATGA TGTTGAAATT GTCATTGAAC TTGCCTGAAG AAGGTAAGGC
6951 CATTGAAGAT GCAGTTAAAA AGGTTTTTGA TGCAGGTATC AGAACTGGTG
7001 ATTTAGGTGG TTCCAACAGT ACCACCGAAG TCGGTGATGC TGTGCGCGAA
7051 GAAGTTAAGA AAATCCTTGC TTAATAAGAT TCTCTTTTTT TATGATATTT
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7251 GCGCGTTTCG GTGATGACGG TGAAAACCTC TGACACATGC AGCTCCCGGA
7301 GACGGTCACA GCTTGTCTGT AAGCGGATGC CGGGAGCAGA CAAGCCCGTC
7351 AGGGCGCGTC AGCGGGTGTG GCGGGGTGTC GGGGCTGGCT TAACTATGCG
7401 GCATCAGAGC AGATTGTACT GAGAGTGCAC CATATGGACA TATTGTCGTT
7451 AGAACGCGGC TACAATTAAT ACATAACCTT ATGTATCATA CACATACGAT
7501 TTAGGTGACA CTATA

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1   GAACGCGGCC   GCCAGCTGAA   GCTTCGTACG   CTGCAGGTCG   ACGGATCAAA
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101 CCTGTTTTCA   TCTGGACCAT   CTCCATAATG   AAGCCTTACA   TGTTTGGCAC
151 GTAGCGGAAC   GTGATCGTCA   CAAACCGTAA   GGTAGAGACC   CCAGATTTTC
201 GCATTTTCTC   TTAAACTCTC   CATTAGCTTA   GGATCTGACG   ATCACCTAGC
251 GACTCTCTCC   ACCGTTTGAC   GAGGCCATTT   ACAAAAACAT   AACGAACGAC
301 AAGCCTACTC   GAATTCGTTT   CCAAACCTCT   TTCGAACCTG   TCTTCAACTG
351 CTTTCGCATG   AAGTACCTCC   CAACTACTTT   TCCTCACACT   TGTACTCCAT
401 GACTAAACCC   CCCCTCCCAT   TACAAACTAA   AATCTTACTT   TTATTTTCTT
451 TTGCCCTCTC   TGTGCTCTG   CCTTAACTAC   GTATTTCTCG   CCGAGAAAAA
501 CTTCAAATTTA   AGCTATTCTC   CAAAAATCTT   AGCGTATATT   TTTTTCCAA
551 AGTGACAGGT   GCCCCGGGTA   ACCCAGTTCC   TCCTATTTTT   TTACTGCGGA
601 AGCGGAAGCG   GAAAATACGG   AAACGCGCGG   GAACATACAA   AACATACAAA
651 ATATACCTTT   CTCACACAAG   AAATATATGC   TACTTGCAAA   ATATCATACC
701 AAAAACTTT   TCACAACCGA   AACCAAAACC   AACGGATATC   ATACATTACA
751 CTACCACCAT   TCAAACTTTA   CTACTATCCT   CCCTTCAGTT   TCCCTTTTTT
801 TGCCTTTTTC   GGTGACGGAA   ATACGCTTCA   GAGACCCTAA   AGGGAAATCC
851 ATGCCATAAC   AGGAAAGTAA   CATCCCAATG   CGGACTATAC   CACCCACCA
901 CACTCCTACC   AATAACGGTA   ACTATTCTAT   GTTTTCTTAC   TCCTATGTCT
951 ATTCATCTTT   CATCTGACTA   CCTAATACTA   TGCAAAAATG   TAAATCATC
1001 ACACAAAACA   TAAACAATCA   AAATCAGCCA   TTTCCGCACC   TTTTCCTCTG
1051 TCCACTTTCA   ACCGTCCCTC   CAAATGTAAA   ATGGCCTATC   GGAATACATT
1101 TTCTACATCC   TAACTACTAT   AAAACAACCT   TTAGACTTAC   GTTTGCTACT
1151 CTCATGGTCT   CAATACTGCC   GCCGACATTC   TGTCCACAT   ACTAAATCTC
1201 TTCCCGTCAT   TATCGCCGCG   ATCCGGTGCC   GTAAATGCAA   AACAAATACC
1251 ATCTATGTCT   TCCACACCAT   CATTTTACTA   TGCTGCCAC   CATCCATTG
1301 TCTTTGACAC   CATATCTTCA   TAACCTGTCA   CCTTGAAACT   ACCTCTGCAT
1351 GCCACCTACC   GACCAACTTT   CATGTTCTGT   TTCGACCTAC   CTCTTGTA
1401 TGACAAATCA   CCTTTTTCAT   CGTATGCACC   TTATTCTCCA   CATCACAATG
1451 CACTATTGCT   TTTGCTTTTT   CACCTGTCAT   ATCCTATTGC   TATTAGATGA
1501 AATATAATAA   AAATTGTCCT   CCACCCATAA   CACCTCTCAC   TCCCACCTAC
1551 TGAAGATGTC   TGGACCCTGC   CCTCATATCA   CCTGCGTTTC   CGTTAAACTA
1601 TCGGTTGCGG   CCATATCTAC   CAGAAAGCAC   CGTTTCCCGT   CCGATCAACT
1651 GTAGTTAAGC   TGGTAAGAGC   CTGACCGAGT   AGTGTAAGTG   GTGACCATAC
1701 GCGAAACTCA   GGTGCTGCAA   TCTTTATTTT   TTTTTTTTTT   TTTTTTTTTT
1751 TTTTTTTTTT   TAGTTTCTTG   GCTTCCTATG   CTAAATCCCA   TAACTAACCT
1801 ACCATTGCGAT   TCAGAAAAAT   TCGCACTATC   CAGCTGCACT   CTTCTTCTGA
1851 AGAGTTAAGC   ACTCCATTAT   GCTCATTTGG   TTGCTACTAC   TTGATATGTA
1901 CAAACAATAT   TCTCCTCCGA   TATTCCTACA   AAAAAAAAAA   AAAAAACACT
1951 CCGGTTTTGT   TCTCTTCCCT   CCATTTCCCT   CTCTTCTACG   GTTAATACTT
2001 TCCTCTTCGT   CTTTTTCTAC   ACCCTCGTTT   AGTTGCTTCT   TATTCCCTTC
2051 CGCTTTCCTG   CACTAACATT   TTGCCGCATT   AACTATATAT   ATCGTAGTAC
2101 ATCTTACAAC   TCCGCATACC   GCGTCGCCGC   GTCGCCGCGT   CGCCAAAAAT
2151 TTACTTCGCC   AACCATTCCA   TATCTGTTAA   GTATACATGT   ATATATTGCA
2201 CTGGCTATTC   ATCTTGCACT   TTTCTCTTTT   CTTCTTCCCA   GTAGCCTCAT
2251 CCTTTTACGC   TGCCTCTCTG   GAACTTGCCA   TCATCATTTCC   CTAGAACTG
2301 CCATTTACTT   AAAAAAAAAA   AAAAAAAAAA   AATGTCCCCA   CTGTTCACTG
2351 TTCATGTTT   ACTTGCTCTT   TACATCTTTC   TTGGTAAAT   CGTAGTTCGT
2401 AGTATTTTTT   TTCATATCAA   AGGCATGTCC   TGTAACTAT   AGGAAATGAG
2451 CTTTTTCTCA   TTCTCTAAAC   TTATACAAGC   ACCTCATGTT   TGCCGCTCTG

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2501 ATGGTGCGGA AAAAAGTCTT CCATGAAGCA AACTGTCCGG GCAAATCCTT
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2601 AACGAAAAAA AAAAAAAAAA TAAAAAATAA AAAGACCAAA TAGTAAATAG
2651 TAACTTACAT ACATTAGTAA ATGGTACACT CTTACACACT ATCATCCTCA
2701 TCGTATATTA TAATAGATAT ATACAATACA TGTTTTTACC CGGATCATAG
2751 AATTCTTAAG ACAAATAAAA TTTATAGAGA CTTGTTTCACT CTAATCTCTT
2801 CTAAACTAGG CCCCAGCTCC TGCCAGTACC CACTTAGAAA GAAATAAAAA
2851 ACAAATCAGA CAACAAAGGC TTAATCTCAG CAGATCGTAA CAACAAGGCT
2901 ACTCTACTGC TTACAATACC CCGTTGTACA TCTAAGTCGT ATACAAATGA
2951 TTTATCCCCA CGCAAAATGA CATTGCAATT CGCCAGCAAG CACCCAAGGC
3001 CTTTCCGCCA AGTGCACCGT TGCTAGCCTG CTATGGTTCA GCGACGCCAC
3051 AAGGACGCCT TATTCGTATC CATCTATATT GTGTGGAGCA AAGAAATCAC
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3201 TCCGAATGAA CTGTTCTCTT CGTACTAAGT TCAATTACTA TTGCGGTAAC
3251 ATTCATCAGT AGGGTAAAC TAACCTGTCT CACGACGGTC TAAACCCAGC
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3401 ATGAACGCTT GACTGCCACA AGCCAGTTAT CCCTGTGGTA ACTTTTCTGG
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3651 ATGTCTTCAA CCCGGATCAG CCCCGAATGG GACCTTGAAT GCTAGAACGT
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4751 GAACCTTTCC CCACTTCAGT CTTCAAAGTT CTCATTTGAA TATTTGCTAC
4801 TACCACCAAG ATCCAAGCTA TCTACTGAGA TTTCTGGCTC TTTTGTGTGA
4851 CTGTACCTA ACCACAGACC AAGCATCCAA GCCATACTTT TTACAGCAGG
4901 AGTTCAAGG TCACTACGTC CAGTGAGAAA TTTAGATAAA ACACCATTTT
4951 CTGCGAGTAC TGGACCAAA CTTATGCAGC TAGAAATTCT CAATTGAGCA
5001 TCAAGATAAT CCAAATCTCT AACTTCAATG TCAAAGTTGA AATATTTCTC
5051 TTTAGAGCGC TCCATTTCTT CTATGAAGCG TTTTGGCGCA AACTCACCTT
5101 CAACTGTCAT TGGGAATGTC TTATGATGGT TTTTGGAAAT TATTATTATC

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5151 CTACCATCAA GCGTCTGACA TTGCTGCAGA TTTCTCCATC TCACTTTTATA
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5251 TGACTGACAA TTTATGACCT GCAGTACATT GTAATGCAAG ACGCTGATAA
5301 ACTGTTCTAC GCCTGGGATC TAACCTACCA GGTCACCTT CAAAAGCTCT
5351 GTGTTTGGTT TTTTGCTGTA TATTATAGAT TTTCTGATAG CCCTGTGTGA
5401 CATTTATGAC GCGGGCAGCG GAGCCATCTG CGCACATAAC GTAAGAGTTA
5451 GCCGTGACGT TTGCGATGTC TTTAATTTC CCGTTAGCCA TCAGAATAGT
5501 CGTGTTTTCA GAAAGCATTT TGATCCGACA TACGATGACC TCAATGATTT
5551 AGATTATGTG TTGCACTTTT ATAGACCTAC CAAAAATCCA GTGCGTACAC
5601 TAATACTTTC ATAAAGATAC CTGAAACAA AACCAGAAAG ATCGGCAAAA
5651 AAATTTTFFF TCTTTGCCGA GATCACAAC CTACTATGAC GAAAAAGCTT
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6501 GGGGTGGGCG GACAAAGCTA CACTGGTAAA ATACAGGATT CTATGAACAA
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6851 TATGTATCAA AAATTTAACA TCTTGAAAAT ACACAAGTGG TGCAAAAGATG
6901 TGTCACGTTT TGGACCTGAG TGGTGCCATG TATGCTATTT AACATGCAAA
6951 GGGGAAGACC CTTCCGCTT ACTGCAATAA TAAAAAGTAT TTTACGCGTT
7001 ACCCAATATA GCAAAGTTT GCGCAAAAAA AAAAAATAAA AACAAATTACA
7051 AACAAAAAGA AAAAAAGGA AATAATAGAA GATCTAACTG AAGCGAAGGC
7101 CAAACTCTT CTCACCTGAC GTAATAGCCG ATACAAAATC TAGAGCAGCA
7151 ACTTTTCTCT TTCTTCACTA AAGCTGCTAC GAAAGTATAG AAAAAATCAA
7201 CGCTCAGAAC TTAGCTCTAT TTCAAGGTAC CATATATATT TCCTTATAAC
7251 TGATGTAAAT TAACTCTAAA GGTGAAGAAT TATTCATCTG TGTTGTCCCA
7301 ATTTTGGTTG AATTAGATGG TGATGTAAAT GGTCACAAAT TTTCTGTCTC
7351 CGGTGAAGGT GAAGGTGATG CTACTTACGG TAAATTGACC TTAAAAATTA
7401 TTTGTACTAC TGGTAAATTG CCAGTTCCAT GGCCAACCTT AGTCACTACT
7451 TTCGGTTATG GTGTTCAATG TTTTGCGAGA TACCCAGATC ATATGAAACA
7501 ACATGACTTT TTCAAGCTG CCATGCCAGA AGGTTATGTT CAAGAAAGAA
7551 CTATTTTTTT CAAAGATGAC GGTAACTACA AGACCAGAGC TGAAGTCAAG
7601 TTTGAAGGTG ATACCTTAGT TAATAGAATC GAATTAAAAG GTATTGATTT
7651 TAAAGAAGAT GGTAACATTT TAGGTCACAA ATTGGAATAC AACTATAACT
7701 CTCACAATGT TTACATCATG GCTGACAAAC AAAAGAATGG TATCAAAGTT
7751 AACTTCAAAA TTAGACACAA CATTGAAGAT GGTTCGTGTC AATTAGCTGA
7801 CCATTATCAA CAAAATACTC CAATTGGTGA TGGTCCAGTC TTGTTACCAG

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7851	ACAACCATTA	CTTATCCACT	CAATCTGCCT	TATCCAAAGA	TCCAAACGAA
7901	AAGAGAGACC	ACATGGTCTT	GTTAGAATTT	GTTACTGCTG	CTGGTATTAC
7951	CCATGGTATG	GATGAATTGT	ACAAATAACT	GCAGGGCGCG	CCACTTCTAA
8001	ATAAGCGAAT	TTCTTATGAT	TTATGATTTT	TATTATTAAA	TAAGTTATAA
8051	AAAAAATAAG	TGTATACAAA	TTTTAAAGTG	ACTCTTAGGT	TTTAAAACGA
8101	AAATTCTTAT	TCTTGAGTAA	CTCTTTCCTG	TAGGTCAGGT	TGCTTTCCTCA
8151	GGTATAGTAT	GAGGTCGCTC	TTATTGACCA	CACCTCTACC	GGCAGATCCG
8201	CTAGGGATAA	CAGGGTAATA	TAGATCTGCC	CGCCGGGAAG	GCGAACCCGA
8251	TCGGATGCAT	CCTCTCTGCT	GCCATGATGC	TGAAGTTGTC	GTTGAACATG
8301	GTTGCTGCCG	GCGAGGCGGT	CGAGCAGGCA	GTGCAGGAGG	TGTTGGACTC
8351	GGGAGTCAGA	ACGGGCGACC	TGCTCGGCTC	GAGCTCGAAT	TCATCGATGA
8401	TATCAGATCC	ACTAGTGGCC	TATGCGGCCG	CGGATCTGCC	GGTCTCCCTA
8451	TAGTGAGTCG	TATTAATTTT	GATAAGCCAG	GTTAACCTGC	ATTAATGAAT
8501	CGGCCAACGC	GCGGGGAGAG	GCGGTTTGCG	TATTGGGCGC	TCTTCCGCTT
8551	CCTCGCTCAC	TGACTCGCTG	CGCTCGGTCG	TTCGGCTGCG	GCGAGCCGTA
8601	TCAGCTCACT	CAAAGGCGGT	AATACGGTTA	TCCACAGAAT	CAGGGGATAA
8651	CGCAGGAAAG	AACATGTGAG	CAAAAGGCCA	GCAAAAGGCC	AGGAACCGTA
8701	AAAAGGCCGC	GTTGCTGGCG	TTTTTCCATA	GGCTCCGCCC	CCCTGACGAG
8751	CATCACAAAA	ATCGACGCTC	AAGTCAGAGG	TGGCGAAACC	CGACAGGACT
8801	ATAAAGATAC	CAGGCGTTTC	CCCCTGGAAG	CTCCCTCGTG	CGCTCTCCTG
8851	TTCCGACCCCT	GCCGCTTACC	GGATACCTGT	CCGCCTTTCT	CCCTTCGGGA
8901	AGCGTGCGCG	TTTCTCAATG	CTCACGCTGT	AGGTATCTCA	GTTTCGGTGT
8951	GGTCGTTTCG	TCCAAGCTGG	GCTGTGTGCA	CGAACCCCCC	GTTTCAGCCG
9001	ACCGTGGCG	CTTATCCGGT	AACATATCGT	TTGAGTCCAA	CCCGGTAAGA
9051	CACGACTTAT	CGCCACTGGC	AGCAGCCACT	GGTAACAGGA	TTAGCAGAGC
9101	GAGGTATGTA	GGCGGTGCTA	CAGAGTTCTT	GAAGTGGTGG	CCTAACTACG
9151	GCTACACTAG	AAGGACAGTA	TTTGGTATCT	GCGCTCTGCT	GAAGCCAGTT
9201	ACCTTCGGAA	AAAGAGTTGG	TAGCTCTTGA	TCCGGCAAAC	AAACCACCGC
9251	TGGTAGCGGT	GGTTTTTTTG	TTTGCAAGCA	GCAGATTACG	CGCAGAAAAA
9301	AAGGATCTCA	AGAAGATCCT	TTGATCTTTT	CTACGGGGTC	TGACGCTCAG
9351	TGGAACGAAA	ACTCACGTTA	AGGGATTTTG	GTCAATGAGAT	TATCAAAAAA
9401	GATCTTCACC	TAGATCCTTT	TAAATTAAAA	ATGAAGTTTT	AAATCAATCT
9451	AAAGTATATA	TGAGTAAACT	TGGTCTGACA	GTTACCAATG	CTTAATCAGT
9501	GAGGCACCTA	TCTCAGCGAT	CTGTCTATTT	CGTTCATCCA	TAGTTGCCTG
9551	ACTCCCCGTC	GTGTAGATAA	CTACGATACG	GGAGGGCTTA	CCATCTGGCC
9601	CCAGTGCTGC	AATGATACCG	CGAGACCCAC	GCTCACCGGC	TCCAGATTTA
9651	TCAGCAATAA	ACCAGCCAGC	CGGAAGGGCC	GAGCGCAGAA	GTGGTCTTGC
9701	AACTTTATCC	GCCTCCATCC	AGTCTATTAA	TTGTTGCCGG	GAAGCTAGAG
9751	TAAGTAGTTC	GCCAGTTAAT	AGTTTGCGCA	ACGTTGTTGC	CATTGCTACA
9801	GGCATCGTGG	TGTCACGCTC	GTCGTTTGGT	ATGGCTTCAT	TCAGCTCCGG
9851	TTCCCAACGA	TCAAGGCGAG	TTACATGATC	CCCCATGTTG	TGCAAAAAAG
9901	CGGTTAGCTC	CTTCGGTCTT	CCGATCGTTG	TCAGAAGTAA	GTTGGCCGCA
9951	GTGTTATCAC	TCATGGTTAT	GGCAGCACTG	CATAATTCTC	TTACTGTCAT
10001	GCCATCCGTA	AGATGCTTTT	CTGTGACTGG	TGAGTACTCA	ACCAAGTCAT
10051	TCTGAGAATA	GTGTATGCGG	CGACCGAGTT	GCTCTTGCCC	GGCGTCAATA
10101	CGGGATAATA	CCGCGCCACA	TAGCAGAACT	TTAAAAGTGC	TCATCATTGG
10151	AAAACGTTCT	TCGGGGCGAA	AACTCTCAAG	GATCTTACCG	CTGTTGAGAT
10201	CCAGTTCGAT	GTAACCCACT	CGTGCACCCA	ACTGATCTTC	AGCATCTTTT
10251	ACTTTCACCA	GCGTTTCTGG	GTGAGCAAAA	ACAGGAAGGC	AAAATGCCGC
10301	AAAAAAGGGA	ATAAGGGCGA	CACGGAAATG	TTGAATACTC	ATACTCTTCC
10351	TTTTTCAATA	TTATTGAAGC	ATTTATCAGG	GTTATTGTCT	CATGAGCGGA
10401	TACATATTTG	AATGTATTTA	GAAAAATAAA	CAAATAGGGG	TTCCGCGCAC

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10451 ATTTCCCCGA AAAGTGCCAC CTGACGTCGA ATATCATTGA GAAGCTGCAT
10501 TTTTTTTTTT TTTTTTTTTT TTTTTTTTTT TATATATTTC AAGGATATAC
10551 CATTGTAATG TCTGCCCCTA AGAAGATCGT CGTTTTGCCA GGTGACCACG
10601 TTGGTCAAGA AATCACAGCC GAAGCCATTA AGGTTCTTAA AGCTATTTCT
10651 GATGTTTCGT CCAATGTCAA GTTCGATTTT GAAAATCATT TAATTGGTGG
10701 TGCTGCTATC GATGCTACAG GTGTTCCACT TCCAGATGAG GCGCTGGAAG
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10801 TGGGGTACCG GTAGTGTTAG ACCTGAACAA GGTTTACTAA AAATCCGTAA
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10901 CTCTTTTAGA CTTATCTCCA ATCAAGCCAC AATTTGCTAA AGGTACTGAC
10951 TTCGTTGTTG TCAGAGAATT AGTGGGAGGT ATTTACTTTG GTAAGAGAAA
11001 GGAAGACGAT GGTGATGGTG TCGCTTGGGA TAGTGAACAA TACACCGTTC
11051 CAGAAGTGCA AAGAATCACA AGAATGGCCG CTTTCATGGC CCTACAACAT
11101 GAGCCACCAT TGCCTATTTG GTCCCTGGAT AAAGCTAATG TTTTGGCCTC
11151 TTCAAGATTA TGGAGAAAAA CTGTGGAGGA AACCATCAAG AACGAATTCC
11201 CTACATTGAA GGTTCACAT CAATTGATTG ATTCTGCCGC CATGATCCTA
11251 GTTAAGAACC CAACCCACCT AAATGGTATT ATAATCACC AACAACATGTT
11301 TGGTGATATC ATCTCCGATG AAGCCTCCGT TATCCCAGGT TCCTTGGGTT
11351 TGTTGCCATC TGCGTCCTTG GCCTCTTTGC CAGACAAGAA CACCGCATTT
11401 GGTTCGTACG AACCATGCCA CGGTTCTGCT CCAGATTTGC CAAAGAATAA
11451 GGTCAACCC TATCGCCACTA TCTTGTCTGC TGCAATGATG TTGAAATTGT
11501 CATTGAACCT GCCTGAAGAA GGTAAGGCCA TTGAAGATGC AGTTAAAAAG
11551 GTTTTGGATG CAGGTATCAG AACTGGTGAT TTAGGTGGTT CCAACAGTAC
11601 CACCGAAGTC GGTGATGCTG TCGCCGAAGA AGTTAAGAAA ATCCTTGCTT
11651 AAAAAGATTC TCTTTTTTTA TGATATTTGT AAAAAAAAAA AAAAAAAAAA
11701 AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AATGCAGCGT CACATCGGAT
11751 AATAATGACG TCTAAGAAAC CATTATTATC ATGACATTAA CCTATAAAAA
11801 TAGGCGTATC ACGAGGCCCT TTCGTCTCGC GCGTTTCGGT GATGACGGTG
11851 AAAACCTCTG ACACATGCAG CTCCCGGAGA CGGTCACAGC TTGTCTGTAA
11901 GCGGATGCCG GGAGCAGACA AGCCCGTCAG GCGCGTCAG CGGGTGTTGG
11951 CGGGTGTCGG GGCTGGCTTA ACTATGCGGC ATCAGAGCAG ATTGACTGA
12001 GAGTGACCA TATGGACATA TTGTCGTTAG AACGCGGCTA CAATTAATAC
12051 ATAACCTTAT GTATCATACA CATACGATTT AGGTGACACT ATA